No. 192 Vol. XLI Part 2 April 1956

GEOGRAPHY

Journal of the

Geographical Association

Price 6s. net **Free to Members of the Association**

THE GEOGRAPHICAL ASSOCIATION

The Geographical Association, founded in 1893, exists to further the knowledge of geography and the teaching of geography in all categories of educational institutions from preparatory school to university, in the United Kingdom and abroad. Membership is open to all who are interested in geography or in education. Privileges of full membership include the receipt of *Geography* (four issues a year) and, in the United Kingdom, the use of the library of books and periodicals. Facilities exist for student, school and college membership at special rates, and local branches exist in England, Wales, Scotland and Northern Ireland, for the organization of lecture and excursion programmes for members in their vicinities.

The annual subscription for full membership is £1 1s., due on September 1st. Cheques and postal orders in payment of subscriptions should be crossed and made payable to the **Geographical Association.** Branch members may pay their full subscriptions through their local branch secretary or treasurer.

Correspondence and inquiries should be addressed to the Honorary Secretary at the Association's headquarters:

The Geographical Association,
c/o The Park Branch Library, Duke Street,
Sheffield, 2.

Subscriptions and general inquiries should be addressed to the Assistant Secretary.

Correspondents requiring a reply should enclose a stamped self-addressed envelope. Members are asked to advise headquarters office at the above address of changes in their addresses, as far in advance as possible.

Geography is published in January, April, July and November and is sent free to all members. Copies are available to non-members at 6s. each and information about back issues and part-sets will be supplied on request. Information for contributors to *Geography* is given on the back cover.

Geography may also be obtained on trade orders from the Association's publishers:

G. Philip and Son Ltd.,
32 Fleet Street, London, E.C.4.

REPRINTS AND SPECIAL PUBLICATIONS OF THE GEOGRAPHICAL ASSOCIATION

Seven Lamps of Geography. An appreciation of the teaching of Sir Halford J. Mackinder, by Professor E. W. Gilbert. *Geography*, vol. xxxvi, March 1951. 1s. 6d.

The Geographical Association 1893–1953. Including "Sixty Years of Geography and Education" by Professor H. J. Fleure and "The Present Position of Geography in Schools" by Dr. O. J. R. Howarth. 68 pp. *Geography*, vol. xxxviii, November 1953. 5s.

Lincolnshire Studies. "Landforms of Lincolnshire" by Professor D. L. Linton; "Changing Geographical Patterns in Lincolnshire" by Professor K. C. Edwards. *Geography*, vol. xxxix, April 1954. 2s.

A Review of Some West European Statistical Sources, by K. R. Sealy. *Geography*, vol. xxxix, July 1954. 10d.

Geography in the Primary School. A report prepared by the Primary Schools and Training Colleges Section Committees. Revised edition 1955. 2s.

Geography in the Secondary School, with special reference to the secondary modern school. A report prepared by Dr. E. W. H. Briault and Dr. D. W. Shave. Revised and enlarged edition 1954. 2s.

The Geography Room in a Secondary School. A report prepared by P. R. Heaton. First edition 1954. 2s. 6d.

Local Studies. Sample studies for local field and regional surveys, prepared by the Secondary Schools Section Committee. Revised edition with regional bibliography 1949. 3s.

Catalogue (sectional) of the Association's Library: Asia. (November 1955.) 2s. 6d. (members), 3s. 6d. (non-members).

Sets of six extracts of O.S. One-inch Maps for teaching and class use, with teaching notes, illustrating four contrasted areas, and including 2 sheets showing contours and water only. 4s. 6d. per set (3d. discount per set on quantity orders).

Geological Transparencies to accompany the map sets. 2s. per set

Prices are net and for direct orders to THE GEOGRAPHICAL ASSOCIATION

PRINTED IN GREAT BRITAIN BY
JOHN WRIGHT & SONS LTD., AT THE STONEBRIDGE PRESS, BATH ROAD, BRISTOL 4

Bamboo as an Economic Resource in Southern Asia

J. OLIVER

BAMBOO IS AN ASPECT OF THE VEGETATION, both natural and cultivated, of southern Asia which has been neglected by geographers, although ever since the first European contact with the area it has been commented upon in general terms. Regional geographers have tended to be rather too conventional in their writings[1] on the importance of bamboo in the landscape and in the lives of the people. I. H. Burkhill[2] says that "Bamboos in the east have a collective value so much beyond all estimation, that it is a little surprising how slowly they made an impression in the west." S. King,[3] a forester of proven ability and sound judgment, frequently rated the value of bamboo highly. He wrote that "no plant is known in the tropical zone which could supply to man so many technical advantages as the bamboo—without the bamboo, the Indian would be poor, very poor indeed."

The plant tribe of the bamboo contributes to the vegetation associations characteristic of much of south and eastern Asia, tropical and sub-tropical Africa, Central and South America. In Australasia and North America only a very limited number of species occur and these have a restricted distribution. No native species occur in Europe, but bamboo has been grown for decorative and commercial purposes. It provides a significant landscape feature and a resource of the peoples of southern Asia. There are some 50 genera and over 500 species so far listed for this member of the *Gramineae* or grass family.[4] In the two main bamboo areas of Central and South America and Asia, approximately 182 and 282 species of bamboo are recorded respectively.

It is generally outside the scope of plant geography to deal with the genera or species of an individual plant. It becomes desirable to deviate partly from normal practice in the case of the bamboo owing to the great variation in the characteristics of different species. A big range of size, wall thickness, speed and habit of growth, flowering and seeding features, as well as of location, make individual species distinct from one another as vegetational elements of value to man and as part of regional plant associations. There is a wide distribution in altitude, from alluvial lowlands up to 11,000 or 12,000 feet in the Himalayas. A similar variation exists in terms of climatic relationships. Whilst bamboo is primarily a lover of heat and moisture, a considerable range of conditions is suitable for different species. It is more characteristic

➤ Mr. Oliver is Lecturer in Geography in the University College of Swansea.

of the wet monsoonal regions but some species, often the thorny types, grow over large areas of southern Asia where the monsoonal dry season is pronounced. Such areas, for example, include the drier parts of peninsular India and the dry zone of Burma, with annual rainfalls down to 40 inches or below. A few species of bamboo can withstand the shade of the upper storeys of the tropical forest, but the majority require adequate light and occur in clearings or along the sides of tracks or on river banks. Little up-to-date scientific information exists as to the soil requirements of bamboos. Allowing for the fact that individual species will probably have more or less well-marked preferences, one has to content oneself with somewhat general observations.[5] The bamboos do not like water-logged soil. A tentative correlation which has been suggested[6] between bamboo and areas affected by vulcanicity, where there is adequate soluble silica in the soil, cannot be applied to explain the full relationship between bamboos and soils, since many species occur where such conditions are not found. A fertile soil with plentiful supplies of soluble silica (distinct from the residual silica content of laterized soils) is desirable but is not a limiting condition for bamboos. More investigation is necessary before these relationships can be clarified.

Large continuous expanses of pure or predominant bamboo cover are the exception rather than the rule. In parts of Burma,[7] north-east India, Indo-China, or Thailand, for example, areas of some hundreds of square miles of bamboo jungle do occur. More usually, however, the characteristic distribution is one of scattered clumps in the forests or around the villages or individual dwellings. Commonly in such instances the clumps are encouraged and conserved by man, and even artificially propagated to provide conveniently accessible supplies of bamboo as well as shade and shelter, and with thorny species, defensive hedges. Such a distribution defies anything more precise than a general description. It presents an almost insuperable cartographical problem unless mapping is to be on large scales, and for such work the details are not available for the extensive areas involved. In aggregate all these scattered occurrences of bamboo, both natural and cultivated, make up an extremely significant total area and a familiar feature of many south Asian landscapes. Bamboo is a natural feature in the seral stages of the development of some vegetation associations, e.g., of secondary forest growth. Allowance must be made for important modifying influences introduced by man. Climax vegetation is often no more than a hypothetical abstraction. The practice of shifting cultivation associated with many of the hill peoples of southern Asia has, in some instances, especially when the rotation of the land has been too rapid, resulted in the replacement of tree jungle by bamboo scrub, just as elsewhere it has been responsible for the multiplication of areas of coarse, poor grasses such as the *cogonales* of the Philippine Islands.

Some bamboos are propagated naturally by seed derived from infrequent but usually periodic and gregarious flowering over large areas. Other species, in a manner which can sometimes become an insidious nuisance, spread by means of underground creeping rhizomes or root stocks. Either method of natural regeneration and spread can be favoured and accelerated by any human or other causes which weaken or damage the competing trees of the forest. Most species can be artificially propagated by layering, cuttings, or transplanting pieces of culm* with some roots attached, as well as by seed.

The origin and the evolution of the bamboo tribe as an element of the vegetation have not been finally determined, although the large number of south Asiatic species may indicate this area as one from which later dispersal has occurred.[8]

Use in the native economy.

Bamboos, together with other plants such as the coconut, areca and toddy palms, and rattan cane, contribute significantly to the regional economic geography of southern Asia. The production of bamboos from Indian forests, for example, in the year 1946–7, was valued at 4·1 million rupees and this figure was probably an underestimate. W. Raitt states that as the numbers would be so great, "any attempt to realize the world's total standing crop of bamboo or even a moderate section of it such as India or Burma would be hopeless." At this stage only a partial assessment of bamboo as a regional feature can be made. The justification for a study of bamboo as a regional element can be found in G. F. Carter's statement that "the worth of a regional study is proportionate to the degree of expertness acquired in knowledge of the interlocking details of the region."[9] Bamboo is one such "interlocking detail." The present population of southern Asia depends upon it for a great variety of purposes. It would be an apt description of the rural economy of much of the area to say that it was still in a wood and vegetable age.

Bamboo stands out as a material resource of peculiar value by virtue of the characteristics of its growth and the nature of its wood. The extreme rapidity of growth of many species means that, in relatively short periods and by carefully planned cutting, very large supplies of wood can be obtained in a form having many advantages, particularly where man's technical capabilities are limited. Bamboo culms yield wood which is light and buoyant in water, yet hard and extremely strong for its weight. They provide a material which is flexible and resilient; one which can be easily and regularly split with a simple metal cutting tool into either thin or thick laths. Its circular cross-section, its smooth surface, its normally hollow form commend it for work for which no easily obtained or even locally made alternative material could be found. When strength is the prime consideration, some of the species have culms which are solid or have but the smallest of internal air spaces between the walls and the nodal diaphragms. Bamboos of the larger species can provide poles, of diameters of up to 10 inches and lengths of a hundred feet or so, more conveniently than anything else in the forests. There are some drawbacks, however, in the use of bamboo. It is subject to the attacks of wood-boring insects and cannot withstand the ravages of the heat and damp of the south Asiatic climate for such long periods as most of the hardwood timbers.

---

* The individual stem of a clump or a creeping rhizome.

Split or whole bamboo is valuable as a constructional material. Southeast Asia is not well endowed with easily quarried stone. Much of the surface rock is deeply decomposed by weathering under damp, tropical conditions. Laterite, cut into blocks and hardened by exposure to the air, is available as a building material in some areas, but elsewhere brick or wood must be used. Wood is the most widely used material. Outside the towns, and except for the more elaborate houses of the richer people, or of the Europeans and Chinese, bamboo is a commonly used building material. A major threefold division of its utilization for house construction can be made. It is used as a makeshift or improvised material when it is the one which is nearest and easiest to hand. This is frequently the case in the urban areas where it provides a complementary material to the more permanent brick structure. Secondly, it is used by peasant villagers, either entirely or in conjunction with hardwood timber frameworks, to supply the material for dwelling houses. Thirdly, among the most primitive tribes, for example the Negrito remnant groups and the more isolated hill tribes, it appears as one of a number of jungle materials used to construct their rough and often temporarily-inhabited shelters. It then becomes of value only when it is the material nearest to hand, which is commonly the case owing to its scattered distribution. The characteristic of easy working makes it invaluable for walling, flooring, often roofing, matting and for such simple and scanty furniture as is required.

In addition to innumerable uses in building, other constructional work for which bamboo is valued comprises a wide range of articles. Drying frames, granaries, elaborate animal and fish traps, waterwheels, scaffolding, the masts and superstructure of boats, ladders; to all these and many other things bamboo is well adapted. Communications in the rural parts of Asia away from arterial routes leave much to be desired. For foot traffic, light bamboo and wood framework bridges or bamboo and rattan cane suspension bridges can be cheaply and easily made. When the river becomes too wide to bridge, quickly constructed buoyant bamboo rafts can be used to cross it. Such rafts are also often used for downstream movement. Tropical hardwoods too heavy to float by themselves may be drifted down the rivers either on bamboo or supported by bamboo floats lashed to the logs.

Bamboo is extensively used for parts of many simple tools and implements. For handles of hoes, knives or daos, and other tools, its application is obvious. Its hollow properties enable its utilization for water buckets and holders as well as many different types of pots and containers for various purposes. For the primitive or secluded hill tribes, and on occasions even for the more advanced peoples, a length of green bamboo frequently provides a cooking utensil which can effectively withstand the heat of the fire long enough to cook the rice or vegetables it contains. Such a method of cooking must have been much more frequently employed in former days when earthenware or metal trade goods were not available and acquaintance with pottery-making techniques was less widespread.

Elevated pipe lines made of lengths of bamboo about two inches in diameter fitted into one another, after the nodes have been pierced, and carried upon bamboo supports, serve as aqueducts to bring water to terraced rice fields or, on occasions, provide ingenious water supply systems to hill villages. An alternative material for water pipes as efficient and as easily obtained is often not available. Sections of bamboo, six inches or so in diameter, provide the cylinders of the Malayan type native piston forge. Bamboo pipes take the blast to the fire. A nozzle of burnt clay or a pierced stone prevents these pipes from being burnt at the fire end. Bamboo is employed in a variety of ways for the stems of tobacco pipes.

Spoons, tongs, cups, knives for all types of uses, needles, combs, do not exhaust either the potential or actual ways in which bamboos can be employed for domestic purposes. Even with the breaking down of local isolation and the widening of local trade, often through the agency of the Chinese retail shop, money transactions for daily needs are often very limited. Self-sufficiency in food and clothes has discouraged the full development of the use of money. Many of the peoples, especially the more primitive hill tribes, still tend to lack a tradition of using money to obtain their requirements. In their present economy they seldom have money to buy all their needs in the form of mass-produced goods from the bazaars or the village shops. There is consequently still a need for home-made articles. Bamboo provides a major source of raw materials for these. It offers the most important material, in the form of strips of varying thickness and width, for basketry and different types of wickerwork. Together with rattan cane, which, however, is more localized in its utilization for such work, it is used for baskets, cages, sieves, as the basis for Burmese lacquered ware, for hats and rain shields, shelving, windows, fishing traps and scoops, winnowing fans and a variety of types of matting. Sufficiently thin strips serve as string, and bamboo ropes can be made from a number of thicker long strips. Nails are an unnecessary luxury in construction so far as humble buildings are concerned. Bamboo thongs and rattan cane supply strong easily used lashings. Bamboo sawing thongs and pieces of split bamboo were one of the most commonly employed materials for frictional methods of making fire.

These may still be employed by the hill peoples despite the increasing availability of matches.

Weapons are still needed by hunting tribes, especially in the hills where local warfare has not been eliminated and where thoughts of head hunting may still linger. Blowpipes, spear shafts, arrows and arrow quivers, sometimes bows, are made of bamboo. The straightness of the culms commends itself for such purposes. Panjis (sharpened and, frequently, fire-hardened stakes), buried obliquely in the ground so that a part of the stake projects, make a formidable barrier to an attacker or pursuer. Such defence methods have been used from time immemorial, and hill peoples still employ them for defence as well as in animal pit-falls or traps.

The relatively easily worked properties of bamboo, its shape and hollowness combine with the resonant properties of the culms of the larger species to provide many different musical instruments of wind, percussion and string varieties. In the case of string instruments the hollow bamboo serves as a sounding chamber. Flutes, whistles, organs, gongs and xylophones, stampers and guitars of many different forms are common. In some cases a form of natural organ has been made in the clumps of bamboo near a village by perforating the growing culms so that the wind blowing through them produces a melodious whistling.

The adaptability of the bamboo is indicated in other ways, such as its frequent use as a food plant in many parts of southern Asia. The young growing shoots provide a vegetable which supplements and varies the rice diet, and which can be made into pickles or preserves. The early shoots, which appear with the onset of the monsoonal rains, are the largest and tenderest. In addition, though their fruits are extremely variable in character, some being fleshy and some small and grain-like, many of the seeds of the bamboos provide a periodic contribution to cereal-like foods. This may be of major significance in populous areas in times of famine, as has been recorded, on occasions, in India. One noteworthy botanical feature of the bamboo is that many of the seeding species of value as food-grains flower only after periods sometimes as much as 30 years apart. When this flowering occurs it frequently affects large areas at approximately the same time. After seeding the culms die down. While there may be a valued temporary crop of seeds for food, this is offset by the loss of supplies of culms until the new plant seedlings reach the stage when cutting becomes possible. In some areas, the Himalayan regions in particular, certain species of bamboo provide leaves which are utilized for animal fodder. Their value for this purpose is accentuated by local deficiencies in the quality and extent of pastures. There exist, too, a number of locally employed medicinal treatments based upon the use of bamboo leaves, and also on a siliceous concretion called tabashir, found in the culms of some species. Some of these medicines may have some scientific justification, but most of them are based entirely on ignorant superstition. It can be recorded, in passing, that the hairs often occurring on the sheaths of growing bamboo culms are reputed to provide a very effective irritant poison when mixed with a meal!

Commercial and industrial potentialities.

In addition to its wide acceptance as a valued material in normal daily life, there are the potentialities of bamboo as an industrial raw material. These may be of interest to both the economic and the regional geographer. Should bamboo become of considerable significance as a material in present or possible future industrial manufacturing processes, such developments would have an important influence on the existing economy and social patterns of southern Asia. Areas at present far removed from the major effects of world economics and fluctuating demands, and now characterized by localized, largely self-sufficient economic life, may well be affected by such changes. Thus may be set in motion a chain of reactions, the consequences of which it would be hard to forecast, but which would certainly contribute to new features of areal differentiation. Plantation agriculture and mineral exploitation for overseas markets have resulted in many forms of extra-regional influence, the imprint of which is sufficiently clear in southern Asia even where European control has been replaced by Asiatic government. The large scale utilization of bamboo for industrial processes, involving not only the exploitation of present bamboo areas but also extensive planting, would intrude new elements into the existing ways of life. The post-war occurrences of paper shortage and difficulties in obtaining paper-pulp, perhaps because of exchange difficulties, make alternative sources of paper-pulp worthy of consideration. In India and Indo-China, for instance, bamboo has been found suitable for the production of lower-grade kraft, writing and printing papers. Over 225,000 tons (1951) of air-dry bamboo is used annually in India for the production of paper-pulp, and this supplies about 55% of the raw material needs of the paper industry. Among the more important Indian mills using this material are the Punaloor Paper Mills (Travancore), India Paper Pulp Company (Naihati, Bengal), the Bengal Paper Mill (Raniganj, Bengal), Titaghur Paper Mill (Twenty-four Parganas, Bengal), Rohtas Industries (Dalmianagar, Bihar), Andhra Paper Mills (Rajahmundry, Madras), Orient Paper Mills (Brajarajanagar, Orissa), Sirpur Paper Mills (Adilabad, Hyderabad), and the Mysore Paper Mills (Bhadravati, Mysore). In 1951, the Titaghur Paper Mills alone were using nearly 100,000 tons of air-dry bamboo. New mills such as those associated with the East Pakistan power project on the Karnafuli, in connection with Colombo Plan development, are designed to use bamboo as a major raw material. In other areas, as, for example, the surveys made by Raitt already referred to, the potentialities of certain localities have been considered so far as their ability to yield sufficient supplies of culms required for an economic unit working entirely on bamboo. There are technical problems especially associated with the toughness and silica content of bamboos, the shortness of the fibres and chemical difficulties in the digestion of the wood. The Imperial Institute in London has been responsible for a number of chemical and mechanical tests of various species of bamboo for paper-pulp manufacture. The experimental results support the view that, for particular purposes, bamboo would supply a satisfactory source of raw material. Bamboos are unlikely to rival the softwood forests of the world as one of the major sources of pulp supply, especially as the coniferous forests are increasingly treated as a crop so that problems of exhaustion should become less acute. Within southeast Asia and India, there is a deficiency of soft woods. So far as the present limited internal capacity for paper manufacture is concerned, a further development of bamboo for pulping, especially when there is an urgent need to reduce expenditure of foreign exchange on imports, would be desirable. Other potential forms of industrial development may see bamboo as a source of cellulose especially for making viscose rayon. It has been suggested that bamboos could be used as means of reinforcing concrete. Such uses are in addition to its employment for more traditional small scale manufactures which generally are significant only in local trade. The major exception was the export of bamboo hats from Java in pre-1939 years. As a world trade article, at present bamboo plays a negligible part, and contributes only one object of many usually classed in trade statistics as "minor forest produce." A periodic but very limited demand for bamboo to be used in decoration or furniture construction in parts of Europe and North America depends upon the dictates of fashion.

REFERENCES

[1] O. H. K. Spate, *India and Pakistan*, London, 1954, does go some of the way towards recognizing this aspect of the area.

L. D. Stamp, *The Vegetation of Burma*, University of Rangoon, Research Monograph No. 1, 1925, gives an excellent picture of bamboo as a vegetation feature.

[2] I. H. Burkhill, *Dictionary of the Economic Products of the Malay Peninsula*, London, 1935, p. 292.

[3] S. Kurz, "Bamboo and its use," *Indian Forester*, vol. i, 1876, p. 219.

[4] The literature on bamboo is scattered. Botanical works devoted solely to bamboo include J. S. Gamble, "The Bambuseae of British India," *Ann. Roy. Bot. Gard. Calcutta*, vol. vii, 1896, and E. G. Camus, *Les Bambusées*, Paris, 1913. No more recent work devoted entirely to the bamboos has appeared although they are dealt with, for example, in A. Arber, *The Gramineae*, Cambridge, 1934.

[5] S. Kurz, *Forest Flora of British Burma*, Calcutta, 1877. Details are given here of the soils (largely on a geological basis) that certain species are said to favour, but the relationship is too general and the soils are not soils in the present accepted sense of the word.

[6] See Professor E. C. Jul Mohr, *The Soils of Equatorial Regions with special reference to the Netherlands Indies*, Amsterdam, 1938, trans. from Nederlandsch by R. L. Pendleton, Ann Arbor, 1944.

[7] For example, the areas discussed by W. Raitt, "The Burma Bamboo Pulp Survey," *Indian Forest Records*, vol. xiv, pt. I, 1929.

[8] C. O. Sauer, *Agricultural Origins and Dispersals*, Bowman Memorial Lecture, New York, 1952, p. 33. Here it is suggested that bamboos were dispersed by man from India or Indo-China.

[9] G. F. Carter, "The Role of Plants in Geography," *Geogr. Rev.*, vol. xxxvi, 1946, p. 122.

This Changing World

EDITED BY L. S. SUGGATE

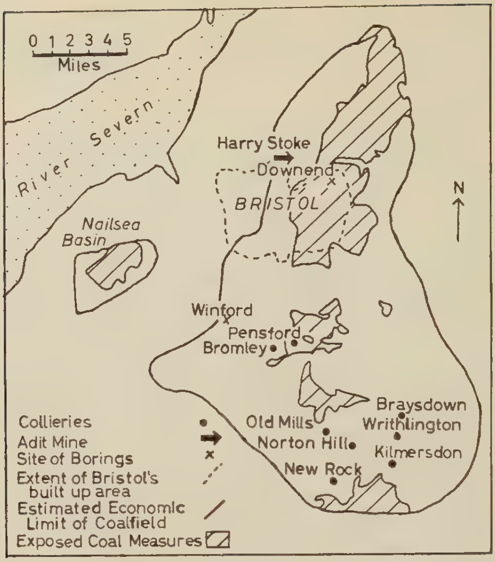
RECENT CHANGES IN THE BRISTOL–SOMERSET COALFIELD

Mainly as a result of National Coal Board policy this coalfield is taking on a new lease of life. Production in 1913 was 1,624,000 tons (Somerset 1,160,000); by 1954 it had fallen to 612,139 tons, all coming from Somerset. At the end of the nineteenth century, 17 collieries were active in the Bristol coalfield; the last of these—at Coalpit Heath—closed down in 1949. Now the Bristol field is beginning to produce again through the new drift mine at Harry Stoke, Filton, where production is expected to reach 450–500 tons a day; about 250 men will be employed. To meet the requirements of the Town and Country Planning Act the colliery is shielded from the road by a tree belt, while the waste material is being used to make playing fields nearby. A large number of old Coalpit Heath miners are seeking employment at the new pit which at present sends all its production by road to industrial concerns. Borings have been made in other parts of the area. At Downend coal has been found at a depth of over 2,500 feet and at Winford estimated reserves are 69 million tons. Coal has also been located by borings in the valley between the Dundry and Mendip Hills. At Avonmouth two coal seams have been discovered but flood dangers, subsidence and high sulphur content are problems making exploitation difficult here.

The production of the eight collieries of the Somerset coalfield is shown in the following table, showing average weekly output for 1954:

Colliery	*Tons*	*Total Manpower*
Braysdown	950	200
Kilmersdon	1,700	300
Norton Hill	4,300	850
Old Mills	1,700	400
Pensford	1,300	450
Writhlington	1,200	300
Bromley	300	80
New Rock	1,100	230

The most notable instance of reorganization and development in the coalfield is at Norton Hill colliery, where the National Coal Board has spent over half a million pounds. As a result the surface workings have been entirely reorganized. Before 1937 all coal cutting was by hand and roadways were undulating and inefficient, but now roadways have been widened, new ones driven, and more mechanical means of winding and conveying the coal from the seams (21 inches to 4½ feet thick) have been installed. The colliery was the first in the area to be fitted with electric winding gear. Before reorganization 775 men were employed, now there are 850 of whom 133 are foreigners. This coalfield was the first to welcome foreign miners and at present 230 are employed, including 98 Poles and 110 Italians.



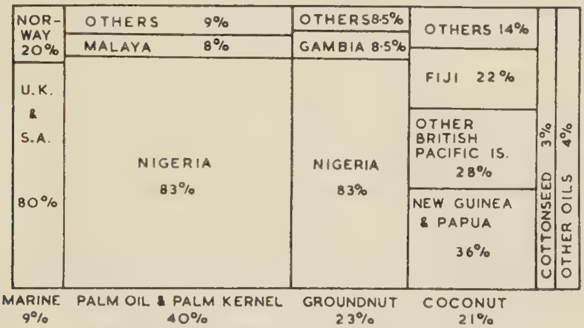
Among other developments may be cited the joining by underground roadways of Writhlington and Braysdown collieries, the further improvement of Old Mills colliery and the installation of new equipment in order to counteract the difficulties of a very narrow shaft at New Rock colliery. An example of the exploratory work is at Old Strip Pit near New Rock. This pit was closed in 1885 owing to the financial inability of the owner to comply with the new safety regulations. At present the shaft is being drained to enable detailed investigation into the possibilities of mining the remaining coal. These modernization programmes have had their repercussions upon the finances of the area. But now that much of the work has been finished the area can look forward to a period of increasing production (at present half the coal produced goes to power stations, 20 per cent to gasworks and 14 per cent for industrial use) and to a gradual reduction in the loss per ton of coal raised.

Research Student at the London School of Economics JOHN F. DAVIS.

BUTTER VERSUS MARGARINE IN BRITAIN

Freedom of choice between butter and margarine was restored in Britain in May, 1954. In 1939, margarine consumption was 10 lbs. and that of butter 24·1 lbs. per head. During the Second World War the margarine ration was larger than that of butter; since the end of rationing, competition has become acute, consumption of both fats has increased to a joint total similar to that of 1939 and the wartime pattern appears to have become stabilized. It is estimated that during the 12 months July, 1954 to June, 1955, 19·4 lbs. of margarine were consumed per head compared with 14·7 lbs. of butter.

The materials used in the manufacture of margarine in Britain during 1953 are shown in the diagram, with the principal countries whence they are imported. (For the purposes of the diagram, materials—groundnuts, etc.—have been converted into "oil equivalents.") Of the raw materials of margarine, Nigeria provides approximately 53 per cent and the British Pacific, including New Guinea and Papua, 18 per cent. Imports of margarine itself, which were negligible before the war, now equal nearly 11 per cent of total consumption; they are mostly of Dutch margarine containing 10 per cent butter. The major sources of butter were New Zealand, 44·1 per cent; Denmark, 34·8 per cent; Australia, 9·3 per cent; the Netherlands, 4·0 per cent and domestic, 5·2 per cent. The economic basis of this competition is the relative cheapness of tropical oil seeds and vegetable oils compared with intensive animal feeding. Within the Commonwealth there is a clash of interests between the Dominions of New Zealand and Australia and some of Britain's colonial territories, including the largest, Nigeria. To each group, the exports involved are of great economic importance. Thus, in 1953 butter accounted for 22 per cent of New Zealand exports and, it may be noted, 15 per cent of those of Denmark. Edible oils and oil seeds formed just over half of Nigerian exports, but there are some small colonies whose prosperity is even more dependent upon one of the raw materials of margarine. Of the total value of exports from the Gambia, 86·6 per cent consisted of groundnuts, while copra or coconut oil formed 85 per cent of exports from both Tonga and the New Hebrides.



Sources of edible oils used in margarine, U.K. 1953. S.A. = Union of South Africa.

The shrunken market for butter in Britain is a matter of considerable concern to those countries which supply it. It is still, of course, large, but the reduction has already affected production besides leading to the search for new markets.

(Statistics derived mainly from publications of the Commonwealth Economic Committee.)

London School of Economics W. T. W. MORGAN.

BERLIN IN 1955

The Pattern of Rebuilding. Compared with a prewar population of 4·3 millions, Berlin now has some 3·4 millions, of whom 2·2 millions are in the western sectors. But apart from this change, the distribution of the population within the metropolitan area has altered. Owing to the disappearance of the central government and to the heavy destruction in the central areas (where 50 per cent of all dwellings were rendered unusable) there is today, in the former city core, a so-called "dead eye," in which neither west nor east has done much reconstruction; the east has done rather more than the west. Reconstruction has emphasized the importance of a number of suburban nuclei, with shops, businesses and entertainments lining, for example, the Kurfürstendamm (British sector), Schloss Strasse (American sector), and Stalin Allee (Russian sector), each of them from two to four miles from the former city hall. Thus the city has migrated out to its suburbs (an interesting parallel is provided, although through totally different causes, by the development of Los Angeles), and the advantages of a central location have, for the time being at least, disappeared.

Rebirth of Industry. The destruction of war, and the demolitions carried out in the early weeks of their occupation by the Russians, reduced Berlin's industrial potential by over 80 per cent; in some branches, notably machine tools, by 100 per cent. As a corollary, unemployment was high and reached a peak in West Berlin of over 300,000. This figure might, indeed, be regarded as surprisingly low if it is remembered that West Berlin has had to find work not only for unemployed civil servants and industrial labourers, but also for 100,000 refugees and for 70,000 of its own workers who were formerly employed in East Berlin but who have been forced, by the political divergence of east and west, to find employment in the western sectors.

Achievements in this sphere have been impressive. West Berlin has succeeded in making itself independent of East Berlin for gas and electricity (although the coal supplies must still come, by rail or barge, through the Eastern Zone); unemployment is down to 120,000 out of a working force of 900,000, and the production index (1936 = 100) is up to 90. (Ruefully, however, the Berliners recall the blockade and point to the West German index, which is in the region of 200.) As before the war, electrical goods and clothing rank as the two most important industries of the city.

Financial Position. Before the war, Berlin derived 50 per cent of its income from its position as capital of Germany and of Prussia—from financial services and administration. In 1950, however, West Berlin could pay with its "exports" for only 50 per cent of its requirements of food and fuel. By 1955, the figure was 80 per cent, but the fact remained that the city could only survive thanks to a huge subsidy from the West German government. This amounted to roughly 800 million DM. in a city budget of 2,000 million DM.; in addition, American aid made possible the city's spectacular rebuilding programme. But the numbers of street sweepers and the tidiness of the green spaces give an indication of the great burden of underemployment, or rather, unproductive employment, concealed by the municipality's swollen payroll.

Trade. Some 70 per cent of West Berlin's industrial production must be sold outside its borders; in fact, West Germany takes some 80 per cent of these exports. Only 2 per cent go to the countries of the Eastern Bloc, apparently because of a lack of eastern goods for exchange rather than through unwillingness to trade. Connections with West Germany are tenuous, as the airlift graphically showed, and all valuable freight is exported by air (the federal government pays the charges). The rail situation in Berlin is interesting. With the drawing of the sector boundaries and the abandonment of the city centre, six of Berlin's terminal stations are out of use, one of them (Stettiner Bahnhof—Russian sector) because the tracks leaving it run for a mile through the French sector before re-emerging into the east. All East German traffic is now routed to the Ostbahnhof, the only main line station and approaches that lie entirely under eastern control; on the western side, the railheads are erstwhile suburban stations. While passenger movement between the eastern and western sectors, by suburban or underground railway, is at present free, there is virtually no movement of goods across the sector boundary. That West Berliners should eagerly await the day of German reunification is—remembering the source of 50 per cent of their prewar incomes—scarcely surprising. In the meantime, they are sensibly assuming that their economic security lies in a further development of industry and are working, in impressive fashion, to this end.

(Based on information from West Berlin official sources, on the Berlin number of *Geographische Rundschau* (August, 1955) and on a visit to each sector of Berlin. An excellent land-use map, covering some four-fifths of Berlin's area, has recently been published by Der Senator für Bau- und Wohnungswesen, on a scale of 1 : 50,000. The (misleading) title is *Ubersichtskarte von Berlin West*.)

Department of Geography, Cambridge JOHN H. PATERSON.

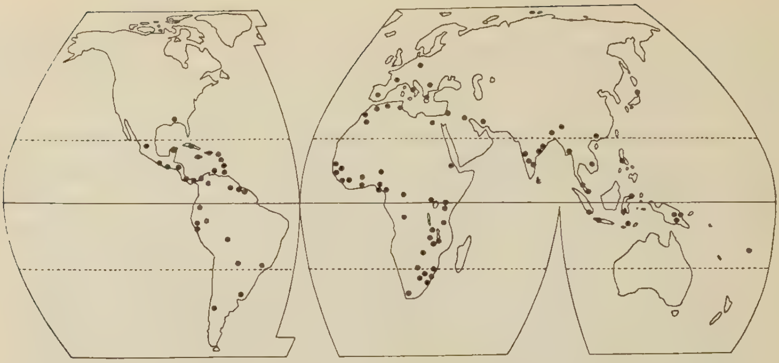
KWASHIORKOR

SOCIAL AND GEOGRAPHICAL RELATIONSHIPS OF A MALNUTRITION OF THE UNDERDEVELOPED AREAS

The Tropic Zone contains both densely peopled and sparsely peopled areas with a considerable range of food crops and techniques, as well as wide differences in the degree to which indigenous ways have been disrupted or displaced by alien influences. Yet very generally there is a greater or lesser degree of overpopulation in relation to available food and the "underdeveloped areas" of modern usage are mainly within this Zone. Examples do occur of healthy, well-fed and prosperous indigenous communities, but they seem to be quite rare.

From a nutritional standpoint, communities may be overfed in quantity or in particular elements, on a properly balanced diet adequate for their output of energy; they may suffer from either undernutrition (i.e., lack of total calories), occasional or perhaps chronic, on the one hand, or on the other, malnutrition (i.e., lack of particular elements in the diet which is ill-balanced). Many instances of all these occur within the Tropics, but this note concerns a particular protein malnutrition found especially in weanlings in many tropical areas. It is now usually called kwashiorkor in the medical literature—a name derived from one of the languages of the Gold Coast—but has many other local names, usually referring to the common changes in skin and hair colour or with an implication of "the deprived child." (For symptoms and pathology *see* H. C. Trowell, in the book noted later. Untreated infants usually die, and in survivors there may be a connection between kwashiorkor in childhood and, in later life, cancer of the liver which is common among many tropical peoples.)

The people quite rightly associate the symptoms with sudden and early weaning of a child. Among many tropical peoples breast-feeding for two or more years has been common; a weaned toddler in a rural area in the



This map, based on a wide range of medical literature, is not a complete one of the distribution of this form of malnutrition, nor of the frequency of its occurrence. Thus, occurrences in Europe are quite rare—the result of unusual ignorance or, nowadays, in times of special dislocation of food supplies as in Hungary just after the second world war. Again, large numbers of dots in South Africa may be due to better reporting by doctors than higher incidence.

Tropics will often eat caterpillars, termites, grasshoppers, etc. which help to balance his diet, but a helpless baby is dependent on the food given to him, usually paps with a very high starch content, made with water, not cow's milk. The long lactation was formerly maintained by tabus on sexual intercourse for this period, and the custom in turn often rested on polygamy. The sudden early weaning—and kwashiorkor—are often caused by a new pregnancy beginning before the end of the long traditional period of breast-feeding. Hence the sense of stigma. On the other hand, this protein malnutrition would not be increasing if socio-religious changes had been accompanied by improved standards of infant feeding. In the emphasis on very starchy infant diets, traditional reverence for the food of the strong (comparable with our ideas about porridge), the priority of the menfolk in receiving protein, and sometimes inability to provide any other than the cheapest and bulkiest food, all play their part. Since many tropical areas depend largely on locally-produced foods, the discussion can take more geographical lines, but differing social traditions must always be borne in mind.

Overpopulation in relation to local resources and existing techniques is a factor in many places, including the Kikuyu reserves. In Kerala (Malabar and Cochin) the consumption of tapioca, a very starchy food, is increasing.

Poverty in particular classes, such as outcasts or orphans, is sometimes a cause, as in parts of Belgian Congo.

Ignorance, even in prosperous communities as among the cash-cropping cocoa farmers of Gold Coast, is a factor. Few affected families are unable to obtain (imported) milk when urged to do so. Even wealthy but ignorant merchant families are affected in Malaya.

Differing staple foods may protect or expose to risk. Relatively prosperous herding groups such as the Masai and the Akamba of East Africa and the Danakil of Eastern Ethiopia escape kwashiorkor because of the traditional importance of protein-rich animal foods, especially milk and blood or meat. On the other hand, malnutrition occurs in areas where the children are weaned on a diet almost exclusively of tapioca (as in parts of Southern

Nigeria), maize (as in Southern Gold Coast and much of East and South Africa, including towns and cities), or bananas (a very starchy food eaten as a staple by some African tribes).

Urbanization under poor and haphazard conditions is a factor, as in parts of the West Indies, Nairobi, Johannesburg, and Djakarta, if earners of low wages are driven to very starchy diets for young and old, even if tradition suggests otherwise.

Infections by worms or micro-organisms of many kinds may turn the scale in causing kwashiorkor in an already malnourished child by cutting down food intake and/or because the parasites compete with the patient for what protein is available.

Kwashiorkor can be prevented by the use of milk or milk powder, and even cured if treated early with skimmed milk powder. Much has been done, using imported milk, as in Belgian Congo and in UNICEF campaigns in southeast Asia. Local supplies would seem preferable in the long term, but milk cattle often cannot be kept because of tsetse in Africa, or because of lack of a cattle-rearing tradition, or sometimes (as in Java) because precious land cannot be spared for such a space-demanding form of food production. Nevertheless prevention is now possible, and maybe even cure, by proper use of protein-rich vegetables such as soya beans, if the people can be persuaded to grow them in adequate quantity and to include them in the weanlings' diet. (*Sources:* Trowell, Davies and Dean, *Kwashiorkor*, London, 1954; items in their bibliography and in the *Tropical Diseases Bulletin;* replies to questionnaire circulated by the present writer.)

University of Liverpool A. T. A. Learmonth.

THE PETROLEUM INDUSTRY OF AUSTRALIA

The year 1955 witnessed a spectacular advance in the petroleum industry of Australia: three large-scale refineries came "on stream" and the total refining capacity multiplied nearly fourfold. Since 1951, four refineries, equipped with catalytic cracking units which convert the heavier constituents of petroleum into lighter and more valuable products, have been built at a capital cost approaching £A115 million, and the throughput capacity of crude oil in Australia has soared from one to eight million tons (ownership: British and Dutch 5·65; United States 2·35). Before 1954, the only refineries operating in Australia had been four small plants equipped solely for distillation.

For security reasons the expansion of the industry has been accompanied both by dispersal and by a shift in the centre of production, though the bulk of the refining capacity remains near the principal markets of Sydney and Melbourne. Prior to the expansion, some 70 per cent of the capacity was located in New South Wales and the rest in Victoria, but Victoria now ranks first with 40 per cent, Western Australia second with 38 per cent, and New South Wales third with 22 per cent. Of the pre-existing plants, those of Commonwealth Oil Refineries at Laverton (1924) and the Vacuum Oil Company at Altona (1948) are both sited in the south-western suburbs of Melbourne, while New South Wales has the Shell Company's plant at Clyde, near Ulladulla (1926), and the Bitumen and Oil Refineries' plant at Matraville, a Sydney suburb on the northern shores of Botany Bay

(1948). Two modern refineries have also been established near Melbourne: the Shell Company's refinery on Corio Bay, Geelong (1954), which has an annual intake capacity of 1·7 million tons of crude oil imported mainly from British Borneo; and the Standard-Vacuum Oil Company's extension to the Altona plant (1955), which now has a capacity of 1·25 million tons and derives its supplies from Wasian, Dutch New Guinea, and Aramco in the Middle East. A third refinery has been built at Kurnell on the southern shores of Botany Bay (1955); it is owned by the Bahrein group operating through Australian Oil Refining, Ltd., and has an annual intake capacity of 1·1 million tons to be drawn mainly from the Persian Gulf and the East Indies. Finally, the largest refinery—and the largest single commercial project in Western Australia—has been constructed by the British Petroleum Company operating through Australian Petroleum Refinery, Ltd. at Kwinana, on Cockburn Sound, 17 miles south of Fremantle (1955); it has a capacity of 3 million tons to be imported from the Persian Gulf. Cockburn Sound not only furnishes the substantial water requirements of the plant (3 million gallons an hour) but constitutes a deepwater, almost landlocked natural harbour, the approach channel of which has been dredged to take the largest tankers afloat. Together, the Australian refineries now have a capacity exceeding home consumption (5·8 million tons in 1954), and a surplus of diesel and fuel oil will be available for export.

It is hoped that eventually the discovery of oil either in Australia, where several large sedimentary basins offer some promise, or in the Australian territories of Papua and New Guinea, will permit the development of an integrated petroleum industry. So far, however, only a negligible yield has been obtained at high cost from the oil sands of the Gippsland basin of Victoria, and there is currently a small output from the oil-shale deposits of New South Wales. But despite a long history of disappointment the search for oil continues to gather momentum.

(Acknowledgment is made of information kindly supplied by the Petroleum Information Bureau (Australia), Melbourne.)

University of Tasmania PETER SCOTT.

Liège and the Problems of Southern Belgium

T. H. ELKINS

TO UNDERSTAND THE GEOGRAPHY of any city, we must look beyond its narrow bounds to the regional setting in which it is found. Of no city is this more true than of Liège, where the unity and importance of the region were recognized by the existence within its limits of the medieval diocese long before the city whose name it was to bear grew to dominate it. This regional setting resembles that of a line of important cities occupying the Hercynian Foreland zone of western and central Europe. To the south lies the great barrier of the Ardenne, one of the uplifted massifs of Hercynian Europe, pierced by the natural routeway of the Meuse. Initially this unattractive upland was avoided by settlers, but its ores, forests and water-power were later of importance to the growth of industry on its northern margin. The extreme north of the Liège region, as is typical of Hercynian Foreland conditions as a whole, is also formed by infertile land, this time by the sandy heaths, shallow ponds and sparse woodland of the Campine. Between these two inhospitable regions lies the wide, loess-covered plateau of Middle Belgium, which falls gently northwards from its maximum height of 650 feet just north of the Sambre–Meuse trough towards the valley of the Demer. This plateau is again only part of the much greater loess belt of the Hercynian Foreland, which stretches from northern France through Belgium and Germany to Silesia, a belt of well-drained land, unfavourable to tree regeneration, and a zone of early cultivation and of easy movement of migrants, traders and armies. The great overland routes from the cities of northern France and the Flemish ports to the Rhine at Cologne followed the loess belt, and near the crossing of the Meuse grew the first centres of the Diocese, the former Roman city of Tongres and the crossing town of Maastricht.

After the middle of the ninth century, the Bishops abandoned these splendid route centres in favour of the rocky slopes and marshy islands of Liège to the south. Although the position of the city at the great northward bend of the Meuse is an excellent one, it is certainly not

➤ Mr. Elkins, who is Lecturer in Geography at King's College, London, held a Belgian Government Postgraduate Scholarship at the *Séminaire de Géographie*, University of Liège, from February to May 1953. His paper was read to the Annual Conference of the Association at the London School of Economics on 4th January 1955. He wishes to acknowledge the kindness and help of Professor O. Tulippe, Mr. F. Dussart, Mr. J. A. Sporck and of many members of the *Séminaire de Géographie*, on whose work he has frequently drawn. Responsibility for the accuracy of all facts and statements remains, of course, his own.

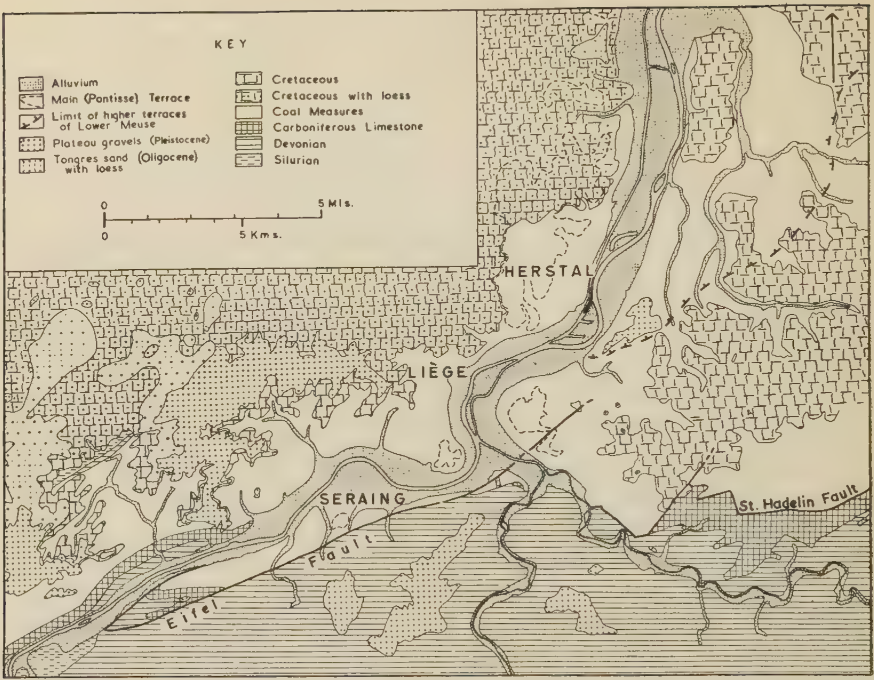


Fig. 1.—The Liège Region—geology.

superior to that of Maastricht. The reasons for the change are not entirely clear, but may have been connected with the incursion of the Northmen, during which Tongres and Maastricht were rendered particularly vulnerable by the very excellence of their communications. Liège itself fell in 881, but rose again and never lost its predominance in the region.[1]

THE SITE OF THE CITY

The site and immediate surroundings of Liège (Figs. 1 and 2) are again typical of the Hercynian Foreland situation in the succession, from south to north, of Palaeozoic rocks on the fringe of the Ardenne, of succeeding Coal Measures, and of an unconformable cover of rocks of Secondary and later ages. But there is much that is individual, particularly in the dominance of two features of the landscape, the plateaux, and the deeply incised major valleys of Meuse and Vesdre which divide them. To the south is the broad plateau of the Condroz, the lowest of the erosion levels that cut the northern flank of the Ardenne, falling from 1,000 feet in the south to 700–800 feet at the Sambre–Meuse. Although the plateau contains some areas of cultivation developed on Carboniferous Limestone bands, its northern fringe consists of a broad band of resistant rocks, mainly sandstones, which form a massive forested bank overlooking the Meuse valley from the south. These Lower Devonian and even Silurian rocks

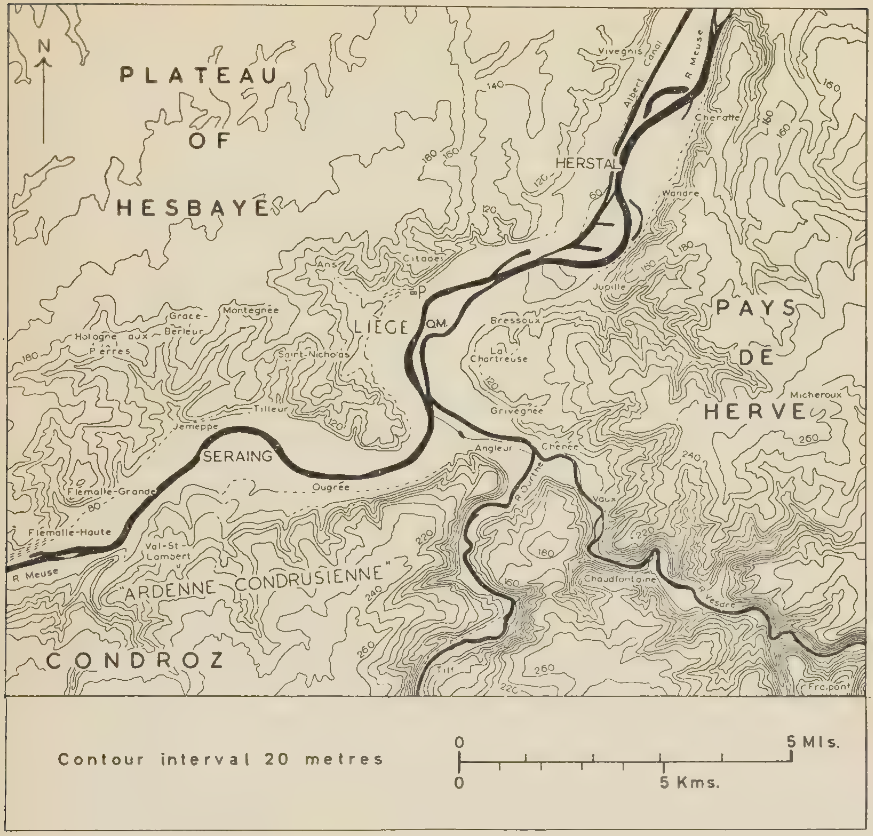


Fig. 2.—The Liège Region—physical features. O.M.—Outre-Meuse. P.—Palace.

represent the core of a great Hercynian nappe (Nappe de Dinant) which was thrust from far to the south over the much younger Coal Measures, considerably contorting them in the process. The similarity between the rocks and woodland cover of this region and those of the Ardenne proper, far away to the south, is responsible for its local name of the *Ardenne Condrusienne*.

The summit level of the *Ardenne Condrusienne* is continued northwards across the Meuse into the highest part of the Hesbaye plateau, which is formed on Cretaceous rocks, in part overlying Coal Measures and other Palaeozoic rocks (Fig. 1). The Cretaceous is, however, rarely seen on the plateau proper, as distinct from its edges, owing to the covering of later deposits. The most interesting of these are the high level gravels found on the plateau at its greatest altitude, which are mapped as early Pleistocene, but the whole plateau, including the gravels, is covered by a thick loess deposit. Its gently undulating surface, with lightly incised dry valleys, declines gently northwards, the pattern of small unhedged arable fields which covers it being interrupted only by the large nucleated villages of Hesbaye, which spring up like islands, each surrounded by its girdle of fruit trees.

The third plateau, that of the *Pays de Herve,* lies to the east, between the Meuse and the Vesdre. Here, again, Cretaceous rocks underlie the plateau, but they are thinner than in Hesbaye, so that the shales of the underlying Coal Measures and the clays of the Lower Cretaceous are close to the surface, which itself bears a deposit resembling our clay with flints. In consequence, surface drainage is much more developed than in Hesbaye, and the degree of dissection is much greater. The damp conditions have encouraged a concentration on grassland dairying. This is also a great fruit-growing region; the meadows are set with fruit trees which, together with the hedges and the dispersed settlement, recall the fruit-growing regions of our own country.

Everywhere the plateaux dominate, their even summit levels barring the horizon. But human activity centres upon the valleys, especially the valley of the Meuse, which at Liège makes its great bend towards the north. The river has incised itself some 450 feet below the plateau level, and its tributaries have cut great combes into the fringe of the Hesbaye Chalk. In the valley, the impression is of constriction, of the cramming of the many activities of a great industrial city into a site which is very narrow indeed. Suitable points for settlement between the steep valley sides and the flood plain were few: the best possibilities were found where, as at the nucleus of Liège, around the Palace, the entry of a tributary provides a gravel fan. Positions intermediate between plateau and valley were limited; the deep incision of the Meuse had left the main (Pontisse) terrace and other minor flats too far above the stream and too waterless for early urban development, while a low terrace is extensively developed only to the north at Herstal. Since medieval times the narrowness of the valley has enforced building on the flood plain, with a consequent danger of flooding which has been increased in more recent times by mining subsidence, and has necessitated the construction of dykes along the river.

The valley itself is divided by narrows into three more open sections, each of which contains a major region of the Liège conurbation (Fig. 2). From Flémalle-Haute the valley first broadens into the Seraing basin; this ends in the constriction just above the Ourthe confluence, and contains a group of heavily industrialized communes dominated by Seraing. Downstream, the valley widens a second time; here, among the numerous past and present channels of the Meuse and Ourthe, is the site of Liège proper. Once more the valley narrows, to open out for the last time at Herstal, another industrialized and densely populated centre.

The nucleus of Liège was the little fortified ecclesiastical centre established by the Bishops of Tongres on the narrow ridge of the Publémont, one side of which was defended by the steep meander

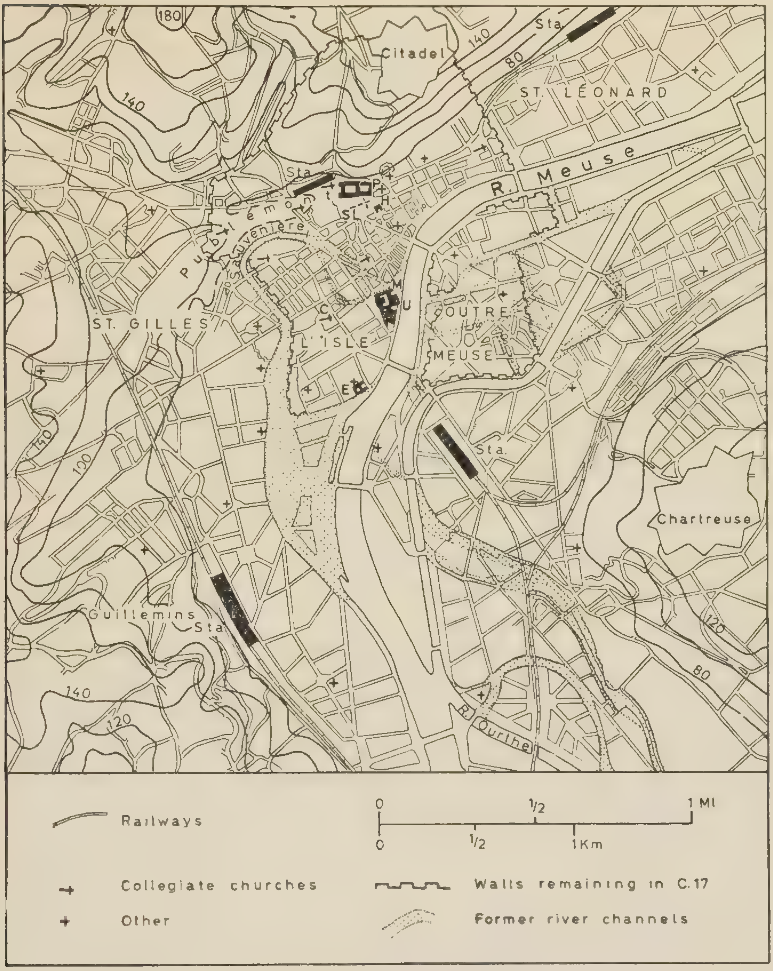


Fig. 3.—Central Liège. P—Palace; H—Hôtel de Ville and Market Place; S.L.—Place St. Lambert, site of former cathedral; C—Cathedral; G—Évéche, present Bishop's Palace; U—University; M—Place Cockerill, open fruit and vegetable market. Contour interval, 20 metres.

scar of the Sauvenière branch of the Meuse, and the other by the valley of a small tributary stream (Fig. 3). The beginnings of the city on the plain that we know to-day are due to the great Bishop Notger (972–1008) who was responsible for the first circuit of walls. Principally under Notger were founded the Bishop's Palace, the Cathedral of St. Lambert, the 7 collegiate churches, the 2 monasteries and the 26 parish churches that signified the importance of Liège as an ecclesiastical centre. The medieval city extended over a number of islands, into which the flood plain was divided by the many channels of the Meuse. An interesting feature of the urban geography of Liège is the use that has been made of these channels, penetrating the old city, to build wide avenues to relieve congestion in the medieval streets (Fig. 3). Where other ancient towns have razed their walls to make boulevards, Liège has filled in its waterways. The Sauvenière branch, circling the *Quartier de l'Isle*, was filled in the early nineteenth century to form one of the city's main arteries, and of the former islands, only Outre-Meuse remains as such to-day.

THE FUNCTIONS OF LIÈGE

Since medieval times, the activities of Liège have remained substantially the same, although varying greatly in relative importance. The city remains an ecclesiastical centre, although the territory of the early diocese is now shared among 10 bishops. The importance of the Bishop has, of course, vastly diminished since the days when he was the ruler of the independent Principality of Liège, particularly since the days when the revolutionaries of 1789 destroyed the great cathedral of St. Lambert, which they regarded as the symbol of his secular power. The city is no longer the capital of an independent state, but only of a Belgian province. The ancient palace of the Prince Bishops is now devoted to provincial administration and the courts of law.

The flourishing commercial and trading activities of Liège are again of early medieval origin. Alongside the churches and monasteries a population of artisans and merchants grew up, who, together with the merchants of adjoining towns such as Huy, took advantage of their position at one of the great crossroads of western Europe. Upstream, the Meuse gave access to Lorraine, Burgundy and even Italy, downstream to the Netherlands and England. By land, the great loess routeway led north-westwards to the Flemish ports, south-westwards to Cambrai and Paris, and above all eastwards to Cologne, the Rhine, and Germany beyond the Rhine. To-day these natural routeways still dominate the transport geography of Liège, helping the city to develop the service and professional activities of a major regional capital. In this connection, mention must be made of the rôle of the city as a centre of university and other forms of higher education.

The importance of Liège to-day, however, is derived primarily from its industrial activities. These, too, can be traced back to medieval times. Coal mining dates at least from the twelfth century, with some hints of Roman working, and the field was one of the first, if not the first, to be worked in continental Europe.[2] The considerable incision of the Meuse and its tributaries into the Carboniferous rocks greatly facilitated the rapid deepening of the mines. From the end of the thirteenth century references can be found to adits (*areines*) driven into the hillsides to drain the mines, and on these the industry principally relied for drainage until the opening of large mines in the early nineteenth century. Each *areine* served many small pits, the coal being removed through vertical shafts. The *areines* and indeed all colliery operations were supervised by a special court, the *Voir Jurés des Charbonnages*, the regulations of which remained in force until the French Revolution.[3]

The best known of the industries of Liège was, however, the working of metals. As in Birmingham, the emphasis was on the manufacture of metal goods, mostly of iron, and not upon smelting. Liège and its countryside were, until the nineteenth century, primarily noted for highly skilled smiths and workers in metal who, using coal as well as charcoal, made a wide range of goods, including iron castings, nails, locks and keys, edged tools and, above all, arms of all kinds, for which the city had a European reputation.[4] The necessary iron was smelted not, for the most part, at Liège but in the Ardenne, at sites determined by the existence of ore, water power and forests.[5] The pig-iron was carried to Liège, where skilled workmen, using the local coal, worked up the metal in the hammer and rolling mills on the streams draining to the Meuse and in the workshops of the city and surrounding villages. At Liège also were the merchants who sent the finished products over the great routeways to the markets of Europe. The third major industry, which has now practically disappeared, was the manufacture of textiles.

On the eve of the Industrial Revolution, the advantages of Liège included the availability of coal; a fine position in relation to international routeways and the existence of a commercial class accustomed to invest in industry and with a considerable accumulation of capital. Mines and manufactures provided a market for the new machines, and, above all, there existed a labour force highly skilled in metal working.[6] It is not surprising that Liège was in a position to receive the new techniques before most of the other industrial centres of the continent, and to develop as a modern industrial region.[7]

THE COALFIELD

The Liège coalfield forms the most easterly occurrence in Belgium of the productive coal measures which occupy the long narrow fold of the Namur syncline, stretching along the Hercynian Foreland from northern France to the Aachen district of Germany. Like all the fields of southern Belgium, the Liège field suffers from difficult physical conditions.[8] It is triangular in shape, only about eight miles wide at its base in the east, tapering westwards for some 20 miles under the influence of the major transverse fold which crosses the syncline at Namur (Fig. 4). The field is consequently small, the area conceded for mining at any time amounts only to about 123 square miles, and there is no considerable northward extension, as in the Ruhr, beneath the Cretaceous cover. Moreover, the field, so close to the Hercynian mountain zone to the south, has been greatly affected by earth movements, the seams of the southern limb dipping at a very steep angle or even overturned under the influence of the Eifel fault. Further disturbance results from subsidiary anticlines, which divide the field into the basins of Seraing in the southwest, Liège in the centre and Herve in the east. The influence of the basins, with their greater reserves of coal, is clearly seen in the present distribution of mines. So much disturbance by folding and faulting inevitably renders exploitation difficult and costly, especially as the better and more accessible seams have long been worked out.

The disabilities of the Liège field, which are typical of southern Belgium, are the more marked in comparison with the Campine field some 30 miles to the north, in which, owing to greater distance from the main orogenic region in the Ardenne, the seams are much less disturbed. Moreover the Campine has been less uplifted and consequently less attacked by erosion than the fields of the Namur syncline. Since, in both fields, the volatile content of the seams increases upwards, a greater proportion of the higher volatile coals, including coking coals, is preserved in the Campine than in the south. Coals of this type (*gras* and *Flénu*, of more than 20 per cent volatile content) account for 99 per cent of the Campine output. By contrast, the output of the Liège field consists, to about the same overwhelming extent, of semi-anthracitic coals of less than 16 per cent volatile content.[9] Although such coals sell well in the domestic market, it is a distinct weakness of this centre of iron and steel production that, like the other Belgian centre of Charleroi, it produces little coal of coking quality and never has done so. In addition, the Campine mines have not, like those of Liège, already worked their best and most accessible coals, since these were preserved from mining until the twentieth century beneath a cover of more recent deposits. The older southern pits are much smaller than the modern pits of the Campine; concessions are, on average, less than one-third the size; output per concession is only one-quarter and average output per mine only one-ninth of that of the Campine which, for both, is 1·3 million tons a year. In the Liège field, in 1951, none of the 38 active mines achieved an output of over 250,000 tons of coal.

Great efforts have been and are being made to improve the efficiency of the southern mines. Output per worker underground has increased fairly steadily since the war, but the south has never caught up with the Campine, and the Liège field has the lowest productivity of all the southern fields. The gap between selling price and cost of production has persisted through the post-war years, necessitating a government subsidy for the pits, while the Campine mines have normally made a profit. Viewed against the wider European background, the position is more serious still. Belgium as a whole, even including the Campine is, with its high wages and social security costs, a high-cost producer, with a productivity per worker well below that of its neighbours in the European Coal and Steel Community.

There is no doubt that in so far as the prosperity of Liège rests upon local coal it has an insecure foundation, and the difficulties of the industry will inevitably increase as the liberalizing measures of the Community expose it to foreign competition.

About 26 per cent of the industrial workers of Liège are employed in coal mining, a high proportion (about 70 per cent) of them being foreigners. Within the Liège industrial region (Fig. 5), mining dominates the industrial structure in two sub-regions, where coal is worked beneath the deposits of, to the east, the Herve plateau and, to the west, the plateau of Hesbaye. Mines are also found in the Meuse valley, but here other occupations are more important. On the plateaux, great spoil banks, the product of over 100 years of modern mining, overlook the small houses of the miners, which are built in irregular rows along a loose network of roads and tracks.

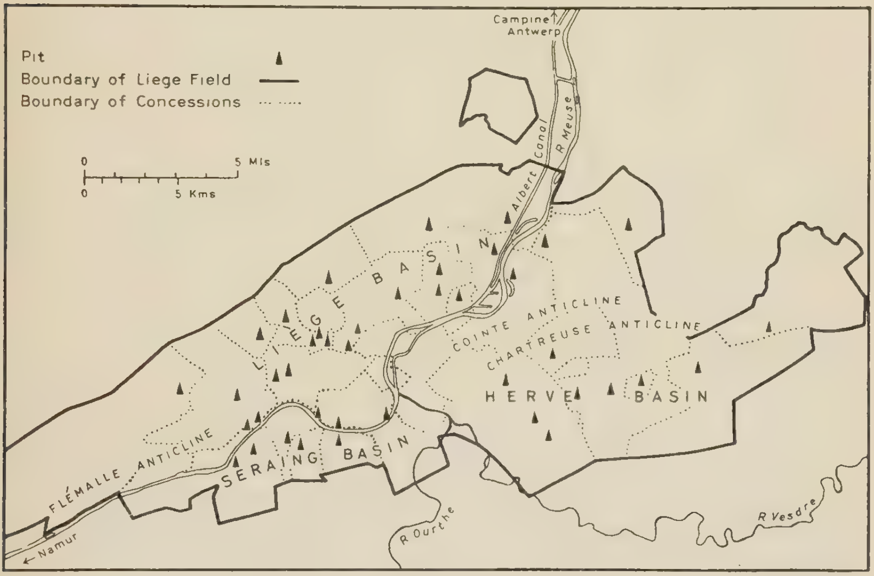


Fig. 3.—The Liège coalfield.

THE METAL INDUSTRIES

The heart and fame of Liège industry is, and always has been, the working of metals, occupying some 42 per cent of the region's working population. The making of iron and steel goods, it is important to remember, long antedates the establishment of an important iron-smelting industry, and the present iron and steel industry has never possessed an adequate local basis of raw materials, either iron ore or coking coal. William Cockerill, the Lancashire mechanic, and his more famous son John, the founders of modern industry at Liège, were not primarily attracted there by the existence of raw materials.[10]

They were simply makers of machinery, initially for the textile industry, who found a market for their products in southern Belgium and the adjoining areas, with, at Liège, an adequate supply of labour accustomed to working in metal. William Cockerill began manufacturing textile machinery at Verviers in 1797, but it was not until 1817 that John, supported by William IV of the Netherlands, moved to the *Château de Seraing*, in an excellent situation in the bend of the Meuse, and proceeded to develop an establishment which was, in many ways, the cradle of the industrial revolution on the Continent. Only at this stage did he turn to producing the raw materials needed for his foundry and machine shops. In 1820 a puddling plant was installed, in 1823 a coke blast-furnace, which, significantly enough, did not work satisfactorily until 1830, and a second furnace using hot blast in 1836.

The Cockerill works and adjoining industrial concerns such as Ougrée-Marihaye have turned the Seraing basin into a great centre of heavy industry, a most distinctive sub-region of Liège.[11] Here are situated the iron and steel works, which now draw their iron ore from abroad and their coal from the Campine or the Ruhr. Liège produces annually about 1·2 million tons of iron, predominantly basic, and about 1·3 million tons of steel, predominantly basic Bessemer, accounting for about 27 per cent of Belgian iron and steel output. The rolling mills deliver a wide range of semi-finished steel products, but there is a definite tendency to concentrate on the manufacture of steel sheet, in great demand by modern industry. In a considerable programme of post-war modernization, two semi-continuous wide strip mills have been installed, as well as cold rolling plant for sheet steel and tinplate. As has long been characteristic of the Belgian iron and steel industry, a high proportion, about 50 per cent, of the rolled products is directly exported.

The Seraing region also contains most of the heavy engineering industry on which rested the city's nineteenth century fame, the concerns being frequently integrated with iron and steel firms like Cockerill or Ougrée-Marihaye. There are also coking plants, chemical works using the coking by-products, power stations, a few remaining collieries and numerous spoil banks and slag heaps, all crowded together with railways, marshalling yards and houses into the narrow valley of the Meuse. The only important concern which stands apart from the others, both physically and in the nature of its product, is the historic glass works at Val St. Lambert at the upstream limit of the Seraing basin.

For the real successors to the old gunsmiths we must move downstream to the northern limit of the conurbation, to the second great industrial sub-region of Liège, dominated by Herstal. Industry, communications and housing are again crowded into the narrow valley of the Meuse, but with this the resemblance to the Seraing region ends, for Herstal is the 'Birmingham' of Liège. The numerous small- and medium-scale firms are characteristically situated in workshops built in the back gardens of houses. Originally they produced mainly small arms; from this they were driven by the competition of American firms which, with large production units and a large home market, could produce more cheaply than the small and individualistic Liège firms. They then took refuge in the production of motor cycles and bicycles, only to be driven from this branch of production for the same reasons. Some firms still produce parts for bicycles, for assembly elsewhere. Others produce a variety of castings, stampings and machined parts for assembly in Liège or other districts of Belgium. As in Birmingham, so in Herstal, there is one giant producer of arms among the many small concerns. This is the *Fabrique Nationale des Armes de Guerre*, or F.N. The recent adoption by the British Army of the F.N. rifle testifies that small arms production at the F.N. is still important, but the range of goods manufactured is actually much wider, including bicycles, commercial motor vehicles, jet engines and, surprisingly enough, milking machines. The resemblance to Birmingham, however, lies more in the past than in the present industrial structure, for Herstal has notably failed to develop those industries of assembly which are so characteristic a feature of medium and light engineering in the West Midlands. This is undoubtedly a point of weakness in the

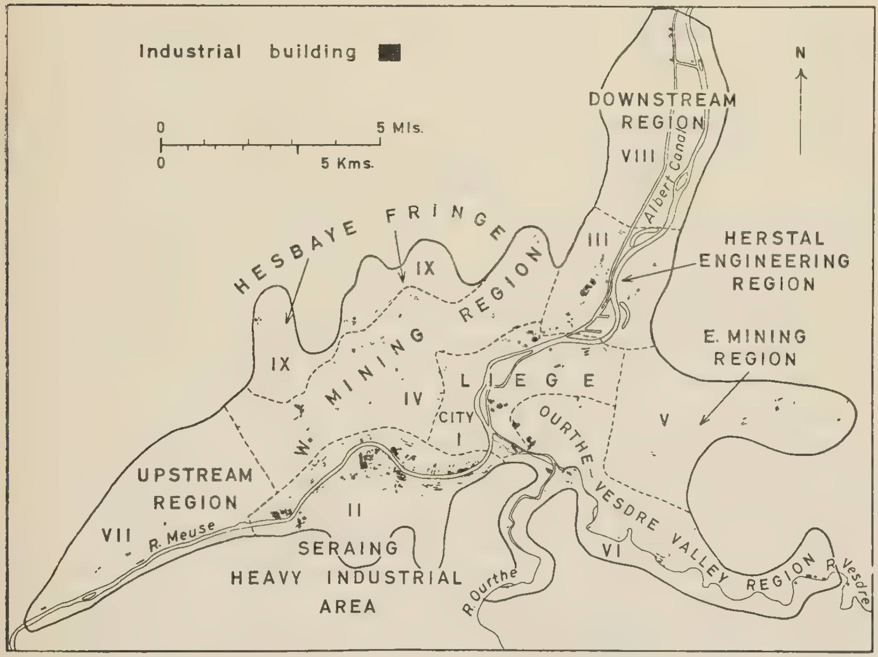


Fig. 5.—Industrial regions of Liège (after Sporck).

industrial structure of the Herstal region, and indeed of Liège as a whole.

Between the two predominantly industrial sub-regions of Seraing and Herstal, the city of Liège itself is dominated by its commercial functions, industry being relatively unimportant. The few large industrial concerns are situated somewhat peripherally, either east of the Meuse (Englebert tyres, steel, engineering) or towards Herstal in the northeast (electrical engineering). The city does, however, contain some reminders of the old artisan production in the small workshops of the makers of luxury sporting weapons, the only form in which the products of the once famous Liège gunsmiths are really competitive in the world market.

The remaining industrial sub-regions of Liège are of lesser importance. To the south, in the valleys of the Ourthe and Vesdre, many of the ancient water power sites are still occupied by small independent rolling mills, concentrating on fine sheet and tubes. Here also is the principal remaining centre of that characteristic Liège industry, zinc-smelting; four units in the Liège region are responsible for about 27 per cent of Belgian output. Associated with the smelting plants are works for the further processing and rolling of zinc and other non-ferrous metals. Of rather similar nature is the Upstream Region, characterized by declining mining and zinc industries and quarrying along the narrow valley of the Meuse.

At the other extremity of the industrial region, there is little industry in the wide valley of the Meuse between Herstal and the Netherlands frontier. Mining is absent, metal working almost so; cement works utilize the chalk of the fringe of Hesbaye. The large stretches of unoccupied land fronting the Meuse and the Albert Canal offer ample possibility for industrial expansion in this region, but so far there has been little disposition to take advantage of the fact. Even the new port of Liège, constructed at the junction of the Albert Canal and the Meuse, has attracted only a few depots for the distribution within the region of waterborne goods like petroleum products, while the banks of the canal remain green. The limited expansion of industry into new sites has taken place not in the Downstream Region but on the north-western fringe of the conurbation, near the railways and, above all, the roads, leading towards Brussels. Here engineering, electrical, food-processing and similar plants have recently been set up.

As in its mining, so in its industry, Liège has its problems, again in many ways typical of industrial southern Belgium as a whole. Many of its old staple products no longer find a ready sale, especially in the export market, which has always been so important for the producers of this small country. The lack of a large and assured home market is a great disadvantage in many branches of production. Belgian firms, relying on the highly competitive and unstable export market, are at a serious disadvantage compared with foreign concerns which export only marginal quantities of their product. Technical changes have also reduced the advantage of location at Liège for certain industries. No longer dependent on local raw materials, they have found it advantageous to set up plants nearer to the port of Antwerp through which they receive their supplies; zinc and glass are two examples.

Secondly, there has been, in twentieth century Belgium, as in all countries, an increasing development of the lighter forms of engineering and of the manufacture of a vast range of consumer goods, both for home consumption and for export. As in our own country, such industries have been attracted, not to the older coalfields, but towards the capital and the chief port, Brussels and Antwerp. In the neighbourhood of these two cities there is, moreover, a considerable pool of labour available in the dense population of agricultural Flanders. While in the last fifty years the workers employed in industry in southern Belgium have increased by 18 per cent, they have trebled in Flanders and doubled in the Brussels region.[12] The rapid industrial expansion of the northern part of the country is certainly not to be deplored, but it has resulted in an absence from Liège of those industries which have increased at the greatest rate in the modern world.

COMMUNICATIONS

These industrial difficulties have been accentuated by certain transport defects. Liège still maintains its central position in relation to the routeways of Western Europe, but the equipment of these routeways has not always kept up with technical progress. Particularly is this true of waterways, and this in a country in which about a quarter of total traffic moves by water. Only in 1940 was the Albert canal completed, to give a direct route to Antwerp for barges of up to 2,000 tons, instead of the narrow and circuitous canals of the Campine. The canal provides a modern and economic routeway for the movement from the Campine of the coking coal needed by the industries of the south.[13] Without its construction, the pre-war tendency for Liège industry to move towards the Campine and Antwerp might well have been accentuated. The other waterways serving Liège are, however, less admirably equipped. Above the city, the Meuse, which could, by improvements to the locks, be made suitable for the standard Belgian canal barges of 1,350 tons, is limited to 600 tons capacity. Below Liège its condition is even worse, for this great river is not navigable across the Belgian–Netherlands frontier. On both sides of the frontier, lateral canals of 2,000 tons capacity exist, the Albert canal in Belgium and the Juliana canal in the Netherlands. To join them, however, is a short stretch of canal with locks at Lanaye, south of Maastricht, which will only take barges of up to 600 tons, loaded to three-quarters capacity. The existence of this *Bouchon de Lanaye* is a severe handicap to Liège industry, as it bars the most direct route not only to the Netherlands but, what is far more serious, to the Rhine. So far, the failure to reach a satisfactory agreement with the Netherlands on the whole subject of the waterway approaches to the Rhine, together with a clash of interest between Liège and Antwerp, has prevented the improvement of the waterway.

Liège is a railway centre of European importance, although, unfortunately, the electrification which has already made such great progress elsewhere in Belgium is not planned to reach the city until later this year. Itself the producer of some 17 per cent of Belgian electric power, it is a major centre of the Belgian 70 kV. power grid and the terminus of 220 kV. international connections to the Netherlands (Lutterade) and Germany (Brauweiler). It is also one of the only two points on the proposed European network of arterial roads at which six roads will meet, those to Amsterdam, Antwerp, Ostend via Brussels, Paris via Namur and Charleroi, Cologne and Eastern France. All but the last of these are included in the Belgian Government's plans for a new arterial road system, but so far construction has been concentrated in the northern part of the country.

POPULATION

Liège remains a great and growing industrial region and conurbation of over half a million inhabitants, some 6 per cent of the population of Belgium.[14] The population of the region has many characteristics in common not only with the remainder of industrial southern Belgium, but with older industrial regions and declining coalfields generally, for example in Great Britain. From a total of 186,000 in 1846 population has grown at a greater rate than that of Belgium as a whole to reach its present total, but the greater part of the rise took place in the years up to 1910. Between that date and 1945 growth largely ceased, although the upward movement has lately returned, with a rise of 47,300, nearly 10 per cent, between 1945 and 1952. Since 1890 the birth rate has been below that of Belgium as a whole, falling from 34·68 per thousand in 1866 to 10·33 in 1937. The years since the war have seen a slightly higher rate, but, in general, over the last 25 years deaths have exceeded births and the population has increased only through immigration. In this respect, Liège and the other industrial regions contrast markedly with the thinly peopled Ardenne to the south and with the densely populated Flemish provinces to the north. On the one hand, in Flanders, is a population with a high birth rate, and with a high rate of natural increase only partly offset by emigration to the Brussels agglomeration or to the south. On the other hand are the older industrial regions, with a low birth rate, little or no natural increase, and maintained by immigration. At Liège in 1947, 30 per cent of the population had been born outside the region. Some of the influx had originated in other parts of Belgium, especially Flanders, but over 50,000 persons, 10 per cent of the population, were of foreign origin, and the numbers have increased since then. These figures represent mainly foreign labourers and their families, half of them, predominantly Italian, employed in mining.

In addition, the inability of Liège to provide sufficient labour to man its own industries is shown by a great daily and weekly movement of workers into the region from the surrounding countryside.[15] The zone of attraction from which these workers, numbering 34,000 in 1947, moved to Liège is not of equal depth in all directions. It is greatest to the north and northwest, within 15–20 miles of the city, in densely populated agricultural Hesbaye. Many workers come from even farther afield, especially from Flemish Limburg, the province with the greatest natural increase in all Belgium, and it is not uncommon for a man to spend four hours a day in travel.

The economic and social difficulties outlined above undoubtedly gain in bitterness from the fact that Belgium is a multilingual state, with two important groups, the Flemings to the north and the Walloons to the south, separated by a linguistic frontier running from east to west across the country. To the very natural apprehensions of the Walloons over their economic difficulties is added the feeling that the Flemings and the inhabitants of Brussels are, in some way, benefiting at their expense. These apprehensions are deepened because the Walloons are conscious of their diminishing relative importance within the Belgian state. They, especially the Liégeois, were largely responsible for creating the new Belgium of 1830, and they dominated it throughout the nineteenth century. French at this time was the dominant language of the country. Now the Flemish and French languages have equal rights, and Flemish is numerically the more important of the two. The population of the Flemish provinces to the north is greater than that of the Walloon provinces and the Brussels agglomeration together. With the much greater rate of natural increase in the Flemish provinces, the disparity in size between the two linguistic groups will certainly increase.[16] Flanders too has its problems, not least of unemployment. Its right to industrial development cannot be questioned. But it is not surprising that the Walloons regard their diminishing status with some alarm, and are apt to feel that their particular difficulties are not always treated sympathetically by the Flemish majority and by administrative and public bodies which are ever more centralized at Brussels.

Thus the problems of Liège and industrial southern Belgium are largely those common to the older type of coalfield industrial region in any country.[17] It is one of the tragedies of Belgium that its lines of division, unlike those of that model multi-language state, Switzerland, all run one way. The boundary between the old industrialized south and the more agricultural north with its new industries in Antwerp, Brussels and the Campine is also the boundary between Fleming and Walloon. The conflicting economic interests of north and south are thus rendered more irreconcilable by being superimposed on existing differences and suspicions between the two linguistic groups.

REFERENCES

[1] J. Lejeune, *La Principauté de Liège*, Liège, 1949. This is a most useful, recent and attractive summary of the history of Liège and its region. See also H. Pirenne, *Histoire de Belgique*, 7 vols., Brussels, 1900–1932.

[2] H. Dewe, "La Houille dans l'Ancien Pays de Liège," *Centenaire* (*Mines*), Liège, 1947.

[3] J. U. Nef, *The Rise of the British Coal Industry*, London, 1932, vol. I, pp. 287–8.

[4] M. Armiaux, *L'Industrie armurière liégeoise*, Brussels, 1899.

[5] P. Michotte, "Localisation de la Sidérurgie Belgo-Luxembourgeoise avant et après 1830," *Bulletin de la Société Belge d'Études Géographiques*, vol. I, 1931.

[6] P. Malburny, "Considérations sur la localisation des industries dans la région de Liège," *Bulletin de la Société Belge d'Études Géographiques*, vol. XX, 1951.

[7] "Grandeur de Liège," special issue of *Industrie*, Revue de la Fédération des Industries Belges 6$^{\text{eme}}$ année, no. 4, 1952 gives summaries of the nature and problems of the principal industries of Liège. See also *Revue du Conseil Économique Wallon*, Liège, every 2 months.

[8] P. Fourmarier and L. Denoel, *Géologie et Industrie Minérale du Pays de Liège*, Liège, 1930; E. Humblet, "Le Bassin Houiller de Liège," *Revue Universelle de Mines*, 8$^{\text{eme}}$ série, tome XVII, no. 12.

[9] European Coal and Steel Community, Haute Autorité, *Informations statistiques*, no. 3, 1954.

[10] See W. O. Henderson, *Britain and Industrial Europe* 1750–1870, Liverpool, 1954, chap. 5, and the numerous works cited therein.

[11] The merger of the Cockerill and Ougrée-Marihaye concerns was announced early in 1955.

[12] *Revue du Conseil Économique Wallon*, no. 1, March 1953.

[13] F. J. Monkhouse, "The movement of coal in Belgium, with special reference to the Kempen coalfield," *Institute of British Geographers*, *Transactions and Papers*, no. 17, 1951.

[14] *La Région Liégeoise, Démographie, Logement, Industrie et Commerce.* Statistical volume published by the *Administration communale de Liège*, Liège, 1951. Belgium. *Annuaire Statistique*, Brussels, annually.

[15] J. Alexandre, "Les facteurs de l'attraction exercée sur la main d'œuvre par la région industrielle Liégeoise," *Bulletin de la Société Belge d'Études Géographiques*, vol. XX, 1951.

[16] H. M. Kendall, "A survey of population changes in Belgium," *Annals of the Association of American Geographers*, vol. 28, 1938. M. F. Herbette, "L'Évolution démographique de la Belgique," *Population*, vol. 9, 1954. Belgium, *Bulletin de Statistique*, 40$^{\text{eme}}$ année, nos. 7–8, Brussels, 1954.

[17] For an account of the rather different problems of rural and upland Belgium south of the industrial belt see J. Charpentier, "Économie de la Wallonie méridionale," *Économie Wallonne*, nos. 5–6, 1950.

Obituary

SIR WILLIAM H. HIMBURY

Sir William Himbury was born in 1871 and died in November 1955. He studied especially questions relating to the supply of cotton to Lancashire industry, including the problem of long-staple fibres, so important for the higher grades of cotton manufactures. He became one of the founders of the British Cotton-Growing Association and was chosen to be its first managing director. This led him to travel widely in Europe, America, East and West Africa, the Sudan, Iraq and India, studying cotton cultivation in its relation to soil, water supply, temperature, land ownership and labour. So he became the pioneer of Commonwealth cotton.

In 1919 began another great scheme when he served on a government committee that led to the establishment of a tropical agricultural college in the West Indies, the Imperial College of Tropical Agriculture in Trinidad, of which he was a governor for nearly 35 years. His advice was also often given to commercial bodies promoting cotton-growing.

The Royal Geographical Society recognized his wide experience of research in economic geography by electing him to its Council and the University of Manchester gave him the degree of M.A. *honoris causa*. In 1931 Sir William accepted the Honorary Treasurership of our Association and gave its finances his sympathetic attention as well as his generous support. Too busy to attend meetings, he always found time for private consultation which gave all who were privileged to take part a glimpse of a most attractive personality combining scientific insight and human interest with business and administrative ability.

H. J. FLEURE.

The Geographical Association

ANNUAL REPORT 1955

The past year has been one of progress and consolidation in a period of uncertain transition from the old to the new subscription rates. Our membership, despite the change, records again a slight increase in numbers. At the close of the financial year there were 3,781 full members (compared with 3,738 in 1954) of whom 546 were student members (compared with 610). Examination of records for recent years reveals that most years show an entry of a few hundred new members and a slightly smaller number of withdrawals—some of which prove to be of temporary duration—so that the overall membership shows a slight year by year increase, with a substantial core of several thousand permanent members.

By no means all of our members are affiliated to local branches. Last year the number of branch members was 965. In view of this incomplete branch coverage, a conference of officers and branch representatives was held at our headquarters on 25th June, to discuss ways and means of furthering branch activities, to exchange information regarding branch organization, and to familiarize branch officers with the work of our officers and staff at headquarters. This conference (the first of its kind to be held) was a great success. Representatives came from branches as far apart as Edinburgh and Exeter. Altogether 42 officers attended the meetings, and we are deeply indebted to Mr. W. R. A. Ellis (Liverpool Branch), who first suggested holding the Conference, for the work of organizing the meeting; and secondly to the numerous members who gave up a weekend to come to Sheffield at a very busy period in the school year. The interchange of views was most profitable and we hope that there will be further opportunities for similar meetings.

There are now 49 local branches; work in one district (Cornish Geographical Association) has been suspended during the year; new branches have been formed at Winchester and in West Middlesex (Isleworth), while the activities of the Coventry branch have been revived. Branch reports include a lively record of lectures, debates, visits and excursions, and several mention meetings concerned with the discussion of teaching problems. Visits and excursions are generally as popular as ever, but (for the first time in recent years) several branches record difficulties during the past year arising from lack of support for organized excursions.

A conspicuous feature of many of the reports was the evidence that many of our branches are interesting quite a wide cross-section of the general public, in addition to their own members, in geography and a geographer's way of thought; this is a most valuable branch service, and the widest possible development of associate membership of this kind is to be encouraged.

Three meetings for members have been organized during the year. The Annual Conference was held as usual in London at the London School of Economics, and maintained the high level we have come to expect under the able direction of the joint conference organizers, Professor Balchin and Mr. R. C. Honeybone. The Spring Conference at York, with an excellent programme, was notable for the large attendance of members, and we are greatly indebted to the officers and committee of the York branch for their efforts in organizing so successful a meeting. The volume of appreciative correspondence received at headquarters bears testimony to the value that members attach to these meetings. Occasionally we receive letters that clearly reveal that the numerous difficulties besetting conference organizers are quite beyond the writer's experience and imagination: The problem of finding accommodation—especially residential—commensurate with the size of the conference, and available at the right time to suit the majority of school holiday periods; the difficulty of finding leaders with expert local experience who may be willing, and are free from other duties, to conduct excursions or to give lectures; the problem of finding adequate transport—are only a few such administrative details. The Honorary Secretary is glad to take this opportunity of emphasizing how much we are indebted to local branches and to our hard-pressed conference organizers for the herculean tasks they perform in bringing conferences successfully to fruition, at times against heavy adverse odds quite unknown to those attending the meetings.

The third meeting held during the year was the Summer School, which, under Professor Smailes' excellent leadership, established a new record in that it was the largest to be held since the war. No fewer than 72 persons set forth on the long trek to Aix-en-Provence, in surely one of the happiest parties of geographers ever to blaze a G.A. trail across Europe as far as the Mediterranean Sea.

The work of the Sections and their committees continues apace and their main items of business are reported below.

The Executive Committee of Council, apart from routine business, has concerned itself with proposals for the formation of an Association of Commonwealth Geographers, which is to be, at first, closely affiliated to our Association. We are indebted to Dr. Kularatnam (University of Ceylon) for the inception of this idea, and already have assurances of the support of numerous distinguished geographers in various parts of the Commonwealth. It is hoped that this will be yet another new venture, organized from our headquarters, in which we may take pride.

The Training Colleges Section reports the holding of three one-day conferences during the year, two of which were joint meetings with other sections. The first met jointly with the Primary Schools Section and centred on a discussion on the revision of our handbook *Geography in the Primary School*. The second was an "out-of-town" meeting held at Bristol, and included excursions, local studies, and discussion on local studies and the secondary modern school. The third meeting was held jointly with the Secondary Schools Section and was concerned with the problems of the teaching of geography in secondary modern schools.

The section has continued its work on the "pictures research project" referred to last year, and the stage of analysing the results of the questionnaire has now been reached. The section also continues to give help in the running of courses for teachers which were mentioned in the last Annual Report.

The Secondary Schools Section has been concerned with a variety of topics during the year. Discussion regarding geography in the modern school (to which reference concerning a joint meeting has already been made) has centred round two separate problems. The first is the provision of direct assistance and advice to teachers in modern schools who have no specialist training and are, perhaps, inexperienced. A suggestion has been circulated that guidance might be arranged locally, through branches, and further discussion on this theme is proposed. The second is concerned with the need for more teachers who have had special training in geography and are qualified to plan their own syllabuses and methods; this matter was jointly discussed with the Training Colleges Section.

The section committee, working arduously under the direction of the chairman, Mr. J. A. Morris, is to be warmly congratulated on the completion of very full, classified lists of text, reference and background books. These lists proved too extensive for publication and have therefore been deposited at headquarters for reference purposes. Other discussions of the section have dealt with: the place of geography in the secondary technical school; the problem of carrying out field work as an integrated part of a syllabus; and the question of making adequate provision for geography rooms in new schools. In connection with this last item, some anxiety has been expressed. The section committee wishes to collect the views and experience of as many members as possible on this important subject and will welcome information from members reading this report.

The Public and Preparatory Schools Section has had a quiet but successful year; no Easter Conference was held comparable to that at Oxford last year, but the membership has increased to a new record of 160. An important matter occupying the attention of members during the year has been the form of the geography paper in the Common Entrance Examination to Public Schools, and a report on this is due to be presented to the annual general meeting of the section.

The section will begin the new year with a new chairman, yet to be nominated; Professor Steers, now resigning from this office after eight years' service, has done a great deal to help the section grow to its present flourishing state, and for his many services warm thanks are cordially extended.

The Primary Schools Section has this year devoted its attention entirely to the revision and redrafting of the Association's handbook for teachers in primary schools. A joint committee of the Primary Schools Section and the Training Colleges Section has been set up and this committee is actively engaged on the preparation of a new handbook for publication in 1956–7.

The Further Education Section committee has held several meetings and has circulated a report on the status of geography in further education, and a memorandum is now being prepared on this subject. Watch has also been kept on examinations and syllabuses of non-university bodies and several representations have been made. A successful one-day school was organized at Garnett College, London, but a weekend conference that was planned had to be abandoned. It is difficult for members of this section personally to attend meetings and, in order to overcome this problem in some measure, three "News Letters" have been circulated. The section has co-operated with the Royal Geographical Society in making representations to the Associated Examining Board in connection with the new G.C.E. examinations.

The Standing Committee for Urban Spheres has made further progress with its country survey, and has now extended the survey to cover Lincolnshire.

The Standing Committee for Visual Aids in the Teaching of Geography. The committee has lost the services of its former secretary, Mr. E. F. Mills who has recently been appointed to a headship. Its present work is concerned with the possibility of co-ordinating certain O.S. maps with air photographs. Individual members have assisted in the organization of exhibitions and in the publication of pamphlets to assist geography teachers in the use of visual aids in the classroom.

The Standing Committee for Field Studies. This committee, which was formed during the year under review, has been concerned chiefly in discovering possible centres for and in considering the needs of summer schools in future years; and actively with the organization of the Summer School held this year at Aix-en-Provence. Much individual correspondence has been conducted with members through headquarters office, dealing with privately organized school field parties in the Sheffield district and elsewhere. On the request of members—and with their help—it is hoped next year to establish a descriptive catalogue, which will be available for consultation, of centres suitable for school field parties.

The Finance Sub-Committee. As implied at the outset of this report, the year has been one of some financial uncertainty, and the Finance Sub-Committee has reported accordingly. We have no clear evidence as to how far the increased subscription rate will meet our urgent needs. The balance sheet shows a substantial increase in our salaries, wages and insurance expenditure, and the year ended with a deficit, offset, however, by the transfer of £100 to our General Reserve. It will be possible to give a clearer picture of the new financial position at the end of the current year (1955–6). But meanwhile it is evident that only very cautious optimism, if any, can be permitted. The committee is indebted to the very generous assistance of Professor Dudley Stamp, a senior Trustee, who has helped us to secure non-trustee stock for investment on very favourable terms, so that our income from interest on investments may be increased. We are especially grateful to him for personal guarantees that he has made regarding these investments such that the Association stands to gain appreciably from his generous help.

To our Honorary Editor, Professor Linton, warm thanks are due for the greatly improved appearance of *Geography*, both inside and outside the cover. This "new face" has delighted our members and we meet the increased printing and publication costs that this incurs without dismay. To Mr. Suggate in special measure thanks are due for the excellent services he has rendered as editor of the feature entitled "This Changing World."

The Honorary Librarian, Mr. Jay, who took office only last January, has already prepared for publication the first section of our long-awaited library catalogue and this is now on sale to members. He hopes to continue production of catalogue sections at regular intervals so that, in the course of the next few years, the publication of the catalogue will be completed. Members who purchase all the sections will be able to use the library loan service with greater ease and profit and at the same time will have a valuable reference work of sources of geographical literature.

This report concludes with a very warm tribute to our senior officers. Throughout his year of office our President, Mr. Suggate, has been a tower of strength, serving the Association with conspicuous devotion and presiding at all meetings of Council, executive committee, finance sub-committee, and at the annual, spring and branch conferences. Our debt to him is a very real one. It is a matter of regret and concern to us all that our President-elect, Lord Nathan, has been seriously ill in hospital. We hope that he will make a speedy recovery to good health and that we may soon meet him, as a very good friend of our subject, in office as our President during the coming year.

Many members will learn with regret also of the recent illness of our very old friend, a Vice-President and former President, Honorary Librarian and Honorary Auditor, Mr. T. C. Warrington. In many ways he is the father of the Association, and now, in his 86th year, maintains a personal link with the days of our foundation. To him we send from the entire Association our very sincere good wishes and greetings.

Our Council, according to the Statutes of the Association, loses four members (Messrs. S. G. Cooke, C. H. Saxelby, J. G. Skinner and W. H. Shepherd) and to them we extend our thanks for their service since 1953. We thank also all who serve on executive and section committees or work independently for the Association in other fields.

Finally, the Honorary Secretary wishes to express her own very deep personal indebtedness, in a special sense, to two members widely known throughout the Association. The first is our Chairman of Council, Professor Fleure, who despite his years is imbued with a tireless strength of mind and purpose and a boundless wisdom that make him the most valued of counsellors, whose advice, unfailingly right, is always so readily given. His help has been sought on innumerable occasions. The second is our Assistant Secretary, Miss Marguerita Oughton, who has now so woven of herself into the very fabric of the Association that we should indeed meet serious difficulties without her guidance and the direction of our office. To friends of the Association such as these our thanks cannot adequately be expressed, and the value of their services is beyond measure.

As this year closes we place on record the sad news of the death of our Honorary Treasurer, Sir William Himbury, in his 84th year. Known to only few of our members, he watched over our financial affairs with no little devotion and very generous interest and his loss is a real one to the Association.

ALICE GARNETT
Honorary Secretary

December 1955

THE GEOGRAPHICAL ASSOCIATION

ACCUMULATED FUND—INCOME AND EXPENDITURE ACCOUNT for the year ended 31st August, 1955

Dr.

		£ s. d.	£ s. d.	1954 £
To *Geography*				
Printing and Publishing		1,490 17 2		1,617
Blocks	113 0 3			
Less Author's Contributions	15 14 0	97 6 3		35
Postage		117 8 11		124
		1,705 12 4		1,776
Less Amount transferred from Publications Reserve Fund to cover extra cost of Diamond Jubilee Issue of *Geography*		— — —		400
			1,705 12 4	1,376
,, Special Publications				
Stock at 1st September, 1954		175 12 8		141
Printing	332 1 0			
Less Receipts from Advertisements	173 10 0	158 11 0		77
		334 3 8		218
Less Stock on hand 31st August, 1955		216 7 9		175
			117 15 11	43
,, Printing and Stationery			243 11 4	262
,, Addressograph			19 7 9	19
,, Insurance			8 10 0	8
,, Salaries and National Insurance			1,265 1 7	1,122
,, Staff Superannuation and Pension Contribution			133 4 8	—
,, Postages—General			215 11 7	219
,, Sundry Office Expenses			35 8 11	19
,, Library Expenses			36 10 8	32
,, Telephone			28 7 9	26
,, Bank Charges			21 14 0	24
,, Officers' and Standing Committee Expenses			147 0 6	131
,, Branch Secretaries' Conference			51 4 5	—
,, Donations and Subscriptions			15 0	1
,, Accountancy Charges			30 0 0	30
,, Subventions to Branches			34 10 0	36
,, Depreciation of Office and Library Furniture and Equipment			43 16 7	23
,, Transfer to General Reserve (1954: Life Members' Donations—Special Appeal)			— — —	110
,, Balance, being excess of Income over Expenditure carried to Accumulated Fund (1954)			— — —	10
			£4,138 3 0	£3,491

Cr.

	£ s. d.	£ s. d.	1954 £
By Sales of Publications etc. and Royalty		426 16 2	355
,, Sales of Special Publications		332 19 5	379
,, Advertisements		355 5 0	400
,, Returned Library Postages		38 1 5	43
,, Closed Branches—Surplus Funds		3 16 9	—
,, Subscriptions			
Current (including voluntary increase)	2,514 12 6		1,938
Refund of Income Tax on Covenanted Subscriptions	135 13 0		144
Arrears	11 6 10		15
		2,661 12 4	2,097
,, Interest on Investments and Building Society Deposits (Investments and Deposits held in Life Membership and Accumulated Funds)			
On Government Stocks (Gross)	70 6 8		71
On Preference Shares	17 14 6		—
On Building Society Deposits	48 0 10		27
		136 2 0	98
,, Surplus on Conferences, *less* amount allocated to General Reserve		37 6 10	7
,, Donations to Library		12 4 0	—
,, Gifts		58 8 0	74
,, Sale of Library Books		— — —	20
,, Exchange of Publications (U.S.A. Subscriptions)		17 17 0	18
,, Balance—Excess of Expenditure over Income for the year carried to Accumulated Fund Account		57 14 1	—
		£4,138 3 0	£3,491

Dr.

MISCELLANEOUS MAPS ACCOUNT—INCOME AND EXPENDITURE ACCOUNT for the Year ended 31st August, 1955

Cr.

	£ s. d.	1954 £
To Stock at 1st September, 1954	153 3 11	211
„ Maps Purchased	90 16 9	77
„ Depreciation of Duplicator	2 19 4	3
„ Balance, being excess of Income over Expenditure transferred to the Publications Reserve Fund	143 17 1	182
	£390 17 1	£473

	£ s. d.	1954 £
By Sales	282 17 6	320
„ Stock 31st August, 1955	107 19 7	153
	£390 17 1	£473

BALANCE SHEET

31st August, 1955

		£ s. d.	£ s. d.	1954 £
Accumulated Fund				
Balance as at 31st August, 1954		257 6 10		247
Less Deficit for the year as per Income and Expenditure Account		57 14 1		(Surplus) +10
			199 12 9	
General Reserve		690 11 6		257
Subscriptions paid in Advance		453 0 7		591
Sundry Creditors				381
Geography 2 issues	753 7 6			625
Superannuation	103 18 0			
Summer School	52 3 0			
Sundry	194 8 8			
		1,103 17 2		
			2,247 9 3	
			2,447 2 0	1,854
Publications Reserve Fund				
Balance as at 31st August, 1954		1,068 13 1		1,262
Add Surplus on Map Sales Account	143 17 1			182
Interest for the year	23 0 11			25
Sundry Creditors	26 7 4			10
		193 5 4		
		1,261 18 5		1,479
Carried forward			2,447 2 0	·3,333

			£ s. d.	£ s. d.	1954 £
Accumulated Fund Assets					
Debtors					
Summer School Account		311 14 10			
Sundry		316 1 1			
			627 15 11		269
Stock of Special Publications			216 7 9		176
Office and Library Furniture and Equipment					
Estimated Value 31st August 1951		150 0 0			
Additions since		348 18 7			
		498 18 7			
Less Depreciation to date		104 9 5			
			394 9 2		203
Investments					
£200 3% Savings Bonds 1965/75 at par (Market Value 31st August, 1955, £154 0 0)			200 0 0		200
Cave Austin & Co. Limited—248 5% Cumulative Preference Shares of £1 each, at cost			190 10 6		
Cash in Hand		17 15 7			
Cash at Building Society	892 13 9				
Less Amount to be withdrawn and paid into bank	92 10 8				
		800 3 1			
			817 18 8		1,006
				2,447 2 0	1,854
Publications Reserve Fund Assets					
Duplicator, at cost		32 3 2			
Less Depreciation		15 7 2			
			16 16 0		20
Stock—Map Sets			107 19 7		153
Sundry Debtors			55 2 6		39
Cash at Building Society		889 16 11			
Cash at Bank		192 3 5			
			1,082 0 4		867
				1,261 18 5	1,079
Carried forward				3,709 0 5	3,708

THE GEOGRAPHICAL ASSOCIATION

BALANCE SHEET—Continued

31st August, 1955

	£ s. d.	£ s. d.	1954 £
Brought forward		2,447 2 0	3,333
Less Transfer to Income and Expenditure Account	— — —		400
			1,079
Life Membership Subscription Fund			
Balance as at 31st August, 1954	2,871 8 9		2,593
Add Subscriptions received during the year	82 10 0		278
		2,953 18 9	2,871
Jubilee Fund			
Balance as at 31st August, 1954	916 19 0		892
Add Interest for the year	26 19 6		27
	943 18 6		919
Less Deficiency on Diamond Jubilee Commemoration	— — —		2
		943 18 6	917
Herbertson Memorial Fund			
Balance at 31st August, 1954	288 12 1		281
Add Interest for the year	8 7 1		8
		296 19 2	289
		£7,903 16 10	£7,010

	£ s. d.	£ s. d.	£ s. d.	1954 £
Brought forward			3,709 0 5	3,708
Life Membership Subscription Fund Assets				
Investments, at Par				
£1,646 4s. 2d. 3% Savings Bonds 1965/75	1,646 4 2			
£300 0s. 0d. 3% Savings Bonds 1955/65	300 0 0	1,946 4 2		1,946
£170 0s. 0d. 3½% Defence Bonds (Conversion Issue) 1964		170 0 0		170
		2,116 4 2		
(Market Value 31st August, 1955, £1,689 8s. 3d.)				
Cave Austin & Co. Limited—985 5% Cumulative Preference Shares of £1 each, at cost		755 4 7		
Cash at Building Society	47 14 7			
Cash at Bank	34 15 5	82 10 0		755
			2,953 18 9	2,871
Jubilee Fund Assets				
Investment, at Par				
£820 0s. 0d. 3% Savings Bonds 1965/75		820 0 0		820
(Market Value 31st August, 1955, £631 8s. 0d.)				
Cash at Building Society	99 6 6			
Cash at Bank	24 12 0	123 18 6		97
			943 18 6	917
Herbertson Memorial Fund Assets				
Investments, at Par				
£250 0s. 0d. 3% Savings Bonds 1965/75		250 0 0		250
(Market Value at 31st August, 1955, £192 10s. 0d.)				
Cash at Building Society	39 9 2			
Cash at Bank	7 10 0	46 19 2		39
			296 19 2	289
			£7,903 16 10	£7,010

We have audited the above written Balance Sheet, dated 31st August, 1955, and certify that in our opinion it is properly drawn up so as to exhibit a true and correct view of the position of the Association at that date, according to the best of our information, and the explanations given to us, and as shown by the books of the Association.

SHEFFIELD.

(*Signed*) HOLMES, WIDLAKE & GIBSON,

L. DUDLEY STAMP,
Hon. Treasurer.

we thank our very active President, not only for giving us one of the best presidential addresses we have had, but also for presiding at so many of the meetings through three long and arduous days. The Association has indeed good cause to honour and to thank him most sincerely.

SPRING CONFERENCE, 1956, AT BRIGHTON

Members are reminded that immediate application must be made by members who wish to attend the conference and have not already done so. Programmes and application forms were issued with the November 1955 number of *Geography*. Further copies can be obtained on application to headquarters or from the Honorary Conference Organizer, Mr. A. H. Fry, G.A. Spring Conference 1956, The Technical College, Brighton, 7.

SUMMER SCHOOLS, 1956

Two courses have been arranged to be held during the earlier part of the summer school vacation. One will be held in Guernsey from 28th July to 12th August, under the direction of Dr. E. W. H. Briault. Notices and application forms for this course were issued with the November number of *Geography*. The other school will be held at Exeter from 28th July to 8th August; the aim of the course will be the demonstration through geography in the field of the characteristics of the Exeter region with special (though not exclusive) reference to geomorphology. Leaflets giving more details of cost and accommodation (which will be in one of the Halls of residence of the University of Exeter) will be supplied from headquarters on request.

Members interested in attending either of these schools who have not already registered are urged to apply immediately to the Assistant Secretary at headquarters for the appropriate forms as the numbers of places will in both cases be strictly limited.

SUMMER SCHOOLS, 1957

Plans are already under way for the organization next year of summer schools both in this country and abroad. Further details will be announced in a later issue of *Geography*.

LATE ISSUE OF THE NOVEMBER, 1955, NUMBER OF *Geography*

It is greatly regretted that the despatch of the November, 1955 number of *Geography* was so seriously delayed. Members will have noticed that a new form of index has been supplied with this issue of the journal; the preparation of the index (which is in any case a lengthy task) increased the problems that have attended the make-up of each part of last year's volume, in which a new style and arrangement of matter have been evolved. The finishing and distribution of the issue were ultimately held up by their coinciding with the abnormal seasonal postal activity. Members are assured that the Editor and headquarters staff will continue to do all in their power to hasten publication of each part in the appropriate month.

ANNUAL CONFERENCE, 1957

The next annual conference will be held in London at the London School of Economics from 1st to 4th January, 1957. It is hoped that it will be possible to issue a preliminary outline programme for the meeting some months in advance of the distribution of the customary programme and notices of the conference in November.

Plain—Welsh Border, Central Wales, Herefordshire and Border, Gloucester—West Cotswolds, East Lincolnshire, Fens—Peterborough, Northants, Tamar Valley (Plymouth), Northwest Devon, Vale of Dorset, Vale of Swindon—East Cotswolds, Southampton, Central Weald, Hastings, East Kent (Canterbury), Southeast Essex. Any members or group of members in these areas who are interested in the possibility of creating or reviving branch activities should write to headquarters for advice on procedure in this matter. (Announcements about proposals for new branch formation are published from time to time in these notes.)

We earnestly hope that, arising from Mr. Ellis's energetic efforts and the enthusiastic response of the representatives who attended the conference, the Association will see both the fuller integration of members into the framework of existing branches, with the creation of many new branches, and a substantial increase in membership resulting from the nation-wide drive which branch officers plan to make. We extend to Mr. Ellis and to all who contributed to the success of this meeting our thanks.

ANNUAL CONFERENCE, 3RD TO 6TH JANUARY, 1956

Once again we enjoyed the hospitality of the London School of Economics for our Annual Meetings and Conference and warm thanks are due to the Director for continuing this generous help that has been given to the Association through a period of no less than 30 years. The conference was a vigorous one in every sense of the word; it is difficult to assess how many members attended, but lecture theatres were always full or indeed overcrowded. The attendance at the Annual Dinner was also a record gathering of 110 members and guests.

The plan of the conference differed from that of earlier annual meetings in that the programme included a series of lectures on various aspects of the geography of the London Basin, with related excursions on the last day. The subjects of the London lectures were Aspects of London's Prehistory by Professor W. F. Grimes; the Problem of London's Drainage by Mr. A. F. Green; the Port of London by Dr. J. H. Bird; the Rôle of London in the Industrial Geography of Great Britain by Dr. M. J. Wise; Agricultural Geography of the London Basin, past and present, by Dr. H. C. K. Henderson; and the Development of London's early Railways in relation to the physical basis by Professor S. W. Wooldridge. It is hoped that we shall be able to publish some at least of these papers.

In addition the programme included a lecture by Professor A. L. Banks on Some Medical Aspects of Geography, at a joint meeting with the Institute of British Geographers and the Royal Geographical Society at the Society's House where once again we received generous hospitality and refreshment. Our President-elect, Professor P. W. Bryan; delighted a large audience with Kodachrome films and commentary on Snowdonia and Anglesey, and Professor A. E. Smailes reported fully on the Summer School held in 1955 at Aix-en-Provence; his report virtually embraced a series of local regional studies in the south of France.

Teaching problems were not forgotten and a packed audience listened with great interest to Dr. Dury's discussion, from the examiner's point of view, of mistakes on river development commonly found in G.C.E. scripts. The Secondary Schools Section in co-operation with the Training Colleges Section discussed "Sample Studies", including a demonstration lesson given before a very large audience by Mr. D. J. Cadman.

This was indeed a conference of many "records," whether of the size of audiences, of the number of coaches required for the excursions, of the number of members in residence at Campbell Hall, or of the number attending the dinner. Mr. R. C. Honeybone was on this occasion for the first time solely responsible for organizing our conference and we congratulate him on the remarkable success of this meeting. To the speakers and lecturers we extend warm thanks, and in special measure may

Background Books

ARCTIC WHALING ADVENTURES

By MICHAEL HYDE. *Pp.* 126, *with* 37 *black and white illustrations.* For ages 10–14. 6*s.*

MAN AGAINST MAN-EATERS

By JIM CORBETT. (*English-Readers' Library.*) *Paper covers* 4*s.*; *Cloth boards* 5*s.* 6*d. net.*
Abridged from MAN-EATERS OF KUMAON and THE MAN-EATING LEOPARD OF RUDRAPRAYAG (*each* 9*s.* 6*d. net*).

MY INDIA

By JIM CORBETT. *Pp.* 204, *with maps.* 10*s.* 6*d. net*

JUNGLE LORE

By JIM CORBETT. *Pp.* 184, *with half-tone plates.* 10*s.* 6*d. net*

THE TEMPLE TIGER: AND MORE MAN-EATERS OF KUMAON

By JIM CORBETT. *Pp.* 204, *with* 10 *half-tone plates.* 12*s.* 6*d. net*

TREE TOPS

By JIM CORBETT. *Pp.* 48, *with* 25 *illustrations.* 6*s. net*
A story of the visit paid by Her Majesty the Queen to Kenya in 1952.

FICTION

A FORTUNE FOR THE BRAVE

By NAN CHAUNCY. Illustrated by Margaret Horder. Tasmanian setting. For ages 10–13. 8*s.* 6*d. net*

AMBARI!
SHIFTA!

By R. FORBES-WATSON. Illustrated by Joan Kiddell-Monroe. *Pp.* 144. African setting. For ages 9–13. *each* 8*s.* 6*d. net*

SAMA (Awarded the 1950 Prix Jeunesse)

SIRGA OWORO KPO THE LEOPARD

By RENÉ GUILLOT. Illustrated by Joan Kiddell-Monroe. Translated by Gwen Marsh. African setting. For ages 8–12. *each* 8*s.* 6*d. net*

THE WIND OF CHANCE

By RENÉ GUILLOT. Illustrated by Pierre Collot. Ivory Coast setting. For ages 11–15. 9*s.* 6*d. net*

THE MOON OF SNOWSHOES

By DONALD SUDDABY. Illustrated by Leonard Rosoman. Central American setting. For ages 11–15. 10*s.* 6*d. net*

Prices are subject to alteration without notice

Further suggestions will be sent on application to the

OXFORD UNIVERSITY PRESS
Education Department **Oxford**

BRANCH NEWS

It is with pleasure that we announce the re-opening of a branch in the Isle of Thanet, thanks very largely to the efforts of a former secretary of the Medway Towns branch, Miss M. Woodward. Meetings will be held in Ramsgate, Margate and Broadstairs and a programme of meetings for the 1956 session is already available. Members who wish to participate in the branch's activities are asked to get into touch with Miss Woodward at 18 Grove Road, Ramsgate.

G.A. LIBRARY CATALOGUE

Supplies of the Asia section of the printed library catalogue are now available, price 2s. 6d. (3s. 6d. to non-members). Orders for the supply of later sections of the catalogue as they become available can still be accepted at headquarters.

L.U.S. REPORT: CHESHIRE

The Department of Geography and Anthropology, University College of Wales, Aberystwyth, is seeking a copy of the Land Utilisation Survey Report for Cheshire by E. P. Boon, to be added to its library collection. Any member who has a copy and is willing to part with it to the University College of Wales is asked to write to Mr. J. A. Taylor, Department of Geography and Anthropology, Alexandra Road, Aberystwyth, mentioning whether the report is offered as a gift or for sale.

SCHOLARSHIPS AT OXFORD AND CAMBRIDGE

Members may have noticed statistical information given in the press regarding scholarship awards, which draws attention to the small number awarded in our subject at Oxford and Cambridge. There have been discussions on this matter at meetings of the Association's executive committee and of the Education Committee of the Royal Geographical Society. At the latter, the Honorary Secretary of the Geographical Association was asked to suggest to members, through the pages of *Geography*, that they should do all in their power to persuade more candidates to enter for such scholarships with geography as a subject. This is felt to be the best way of trying to remedy the position.

PHOTOGRAPHIC DISPLAY SETS

The United States Information Service, 5 Grosvenor Square, London, W.1, announces the availability on loan of display sets of photographs, both mounted and unmounted. A classified list of sets can be obtained from the above address. There is no charge for loans, which are for 2 to 4 weeks normally. A typical set under "Agriculture" is "Cattle rancher in the U.S.—a cattle farmer and his family who are farming successfully in a naturally semi-arid section of Colorado: 15 pictures (card-mounted)".

STUDENT GEOGRAPHICAL CONFERENCE

The Sixth Inter-varsity Geographical Conference, organized by student societies, will be held at the Queen's University, Belfast, from March 20th to 24th, 1956. Further information can be obtained from Mrs. E. Cooke, Hon. Secretary Conference Committee, The Geographical Society, Department of Geography, The Queen's University, Belfast.

GEOGRAPHICAL ARTICLES

The classified list of articles in periodicals received in the Library will be published in the next part (April) of this volume.

NOW AVAILABLE

A New Westermann Wall Map of

THE BRITISH ISLES

Scale 1: 600,000 Size 72″ × 90″.

This Large-scale Physical-Political Map provides a most generous amount of detail. All major towns and communications are clearly shown. Land heights are shown by eight layer tints and sea depths with six shades so that a very vivid picture of configuration is given.

The large size ensures easy viewing from every part of the classroom.

Mounted on strong linen backing and fitted with rollers secured by fastening straps at each end. £8 10s.

WASHABLE OUTLINE WALL MAPS

These Maps are made of strong black plastic-coated fabric which can be chalked on and wiped clean with a damp cloth. They provide two reversible permanent outlines in pale blue with a few selected rivers.

Size 54 × 42 in. Each **£4 10s.**

NOW AVAILABLE: Number 4

EUROPE	1:5,000,000 one side
THE WORLD	1:24,000,000 on reverse

ALREADY PUBLISHED

1. THE BRITISH ISLES	1:1,000,000 one side
SCOTLAND	1: 500,000 on reverse
2. THE BRITISH ISLES	1:1,000,000 one side
ENGLAND AND WALES	1: 600,000 on reverse
3. SCOTLAND	1: 500,000 one side
ENGLAND AND WALES	1: 600,000 on reverse

All enquiries and orders should be sent to

The GRANT EDUCATIONAL Co. Ltd.

LONDON: 12 Cursitor St., E.C.4. GLASGOW: 91/93 Union St., C.1

MAP RELIEFS

MOULDED PLASTIC MAPS

THESE TOUGH, LIGHTWEIGHT, PLASTIC RELIEF MAPS HAVE BEEN WELCOMED BY GEOGRAPHY LECTURERS AND TEACHERS AS OUTSTANDING NEW TEACHING AIDS

Students can see and feel the hills, mountains, drainage patterns, colour them with wax pencils and paints—then wipe off easily. Areas include:—

England and Wales
Scotland
Ireland
Europe
Africa
N. America
S. America
U.S.S.R.
Asia
Australia

Price **15s.** each

S.E. England	£1 10 0 each
The Isle of Wight	£1 10 0 ,,
The Belfast Area	15 0 ,,
Mountains of Mourne	£1 0 0 ,,
West Riding	£1 10 0 ,,

Etc.

The Cairngorms
S. Wales Valleys
Mid Severn Valley
South Downs

(Areas covered by G.A. map sets)

Price **6s. 6d.** each

Write for full details and complete range:

MAP RELIEFS

33, Millcrest Road, Goff's Oak, Herts.

MEIKLEJOHN

announces

the first of a new series of teaching wall-maps

THE BRITISH ISLES, Physical

Takes in the nearest land masses and the Continental Shelf. In four colour printings. Mounted on strong cloth, dissected and eyeleted.

size: 40 × 32 in. price: **15s.**

THE INTERMEDIATE ATLAS, by Bartholomew
For juniors and secondary-modern schools
price: **4s.** limp or **4s. 6d.** boards

THE COMPARATIVE ATLAS, by Bartholomew
For G.C.E. level work.
A quality atlas.
price: **10s. 6d.**

MEIKLEJOHN & SON, LTD.
15, Bedford St., London, W.C.2.

RARE and OUT OF PRINT

BOOKS

ON

TRAVEL and
TOPOGRAPHY

AND

OTHER SUBJECTS

Lists free from :

BCM/MAILAD,
LONDON, W.C.1.

(Libraries and small collections purchased)

A GEOGRAPHER'S REFERENCE BOOK

published by

THE
GEOGRAPHICAL HANDBOOK
COMMITTEE
(President : Prof. H. J. Fleure, F.R.S.)
at 14s. 6d.

**SPECIAL PRICE
TO MEMBERS of the
GEOGRAPHICAL
ASSOCIATION
for Direct Orders only**
11s. post free

Distributed by

The Geographical Association
c/o The Park Branch Library,
Duke Street, Sheffield 2

The Making of the

English Landscape

"This admirable new survey"

—SUNDAY TIMES

Introductory Volume

THE MAKING OF THE ENGLISH LANDSCAPE

W. G. HOSKINS

"This masterly introduction to an almost inexhaustible subject."—L. Russell Muirhead, *Sunday Times* (25s. net.)

County volumes, available now

CORNWALL by W. G. V. BALCHIN

"No better means of understanding could be had than this thorough and interesting book."—*The Field.* (16s. net.)

LANCASHIRE by ROY MILWARD

"This admirable and informative book is one not only to read through pleasantly but to keep and refer to."—*The Times Literary Supplement.* (16s. net.)

GLOUCESTERSHIRE by H. P. R. FINBERG

"Mr. Finberg does his task admirably in his volume on Gloucestershire."—*News Chronicle.* (16s. net.)

In active preparation

LEICESTERSHIRE AND RUTLAND

by W. G. HOSKINS

The Publishers are **HODDER & STOUGHTON** *in the City of London*

Reviews of Books

With very rare exceptions, books reviewed in this journal may be borrowed from the Library by full members or student library members of the Association.

Thames Estuary. (The Regional Books.) W. Addison. 14 × 22 cm. xii + 211 pp. London: Robert Hale Ltd. 1954. 18s.

Though from an etymological point of view the Thames estuary begins at Teddington, most geographers would place its landward limit well east of London because of the great contrasts in the width and alignment of the river reaches. Therefore, it comes as some surprise to read the heading of the second chapter of this book: "The Tower of London." For here London Bridge is taken as the estuary limit, and Mr. Addison is much more concerned with the past history of buildings and institutions than he is with the great waterway itself. This is a pity, for the Thames serves as the busiest commercial threshold of this country, where fifty million tons of goods pass annually. Not only does this phenomenal activity receive scant notice, but something amounting almost to regret seeps into the author's style whenever he is forced to mention some of the astounding features of the modern port and its associated industry. Why is it that as soon as the year 1900 is passed, historians seem to lose their capacity for wonder?

In its discursive way this book will gently lead the reader down the Essex and Kent shores, giving him an interesting introduction to the local history of the borders of London River.

J. B.

Report from Malaya. Vernon Bartlett. 14 × 22 cm. 128 pp. London: Derek Verschoyle Ltd. 1954. 10s. 6d.

The author visited Malaya in 1953. The book is mainly an account of his impressions of what have become known officially as the *emergency* and the *communist terrorists*. It is of interest to the geographer because it contains "background" chapters on the history and economy of the country. It also includes descriptions and one excellent air photograph of the new towns and villages which have recently become part of the demographic pattern of Malaya as a result of the movement of half a million Chinese squatters from the fringes of the jungle to places where they can be protected from the communists. The other 14 photographs, especially the jungle ones, are very good. But the sailing craft in the picture facing p. 32 are *sampans*, not *junks* as stated in the caption.

R. R. R.

Cargoes on the Great Lakes. M. McPhedran. 14 × 20·5 cm. 198 pp. London: G. G. Harrap and Co. Ltd. 1954. 10s. 6d.

This book is a piece of first-class teaching; it takes a unit-topic of prime importance, treats it in "the detail of reality," and clearly demonstrates its geographical setting and the web of its relationships far and near. It does this in a way to delight eleven-year-olds. Yet senior pupils will find in it much significant and up-to-date information about conditions of trade in the Great Lakes, and even teachers will find useful ideas. The numerous small line-drawings have point and humour, but the addition of a few full-page photographic illustrations would provide a standard of reference for the many mental pictures evoked by the author.

F. J. C.

Nunamiut: among Alaska's inland Eskimos. H. Ingstad. 14·25 × 22·25 cm. 254 pp. London: Allen and Unwin Ltd. 1954. 21s.

Most Eskimos live on the coasts of their territory and few try to remain inland, for caribou afford a more precarious mainstay than the seal. Nunamiut, however, is one of the isolated inland tribes, having little contact with the coast and white influence. The book reveals a little-known side of Eskimo life and one which is disappearing as caribou become scarcer. The author spent a year among these people and so is able to give a vivid account of their ways. The teacher who takes the trouble to read this book will find an aspect of Eskimo life that is little known.

R. N. R. B.

Kulturgeografisk Atlas. Vol. I, Atlas: vol. II, Text. Johannes Humlum. 18 × 26·5 cm. xx+127 pp. (vol. I). Copenhagen. Gyldendalske Boghandel: Nordisk Forlag. 23.50 kr.

Atlas of Economic Geography. J. Humlum. (Vol. I only.) London. Meiklejohn. 15s.

This is a Danish counterpart of the Oxford Economic Atlas though smaller and more limited in scope. National production and trade are shown by proportional spheres on world maps at 1 : 225 million throughout, and supplemented by larger-scale insets of important areas in each case. Titles and legends are in four languages including English, and sources are quoted. With the text in vol. II (Danish only) this atlas forms the fourth edition of a work first published in 1936 and now brought up to date. It is well produced and contains many features of interest though limited by the small scale of the maps, the omission of all but a few manufactured goods and loss of space due to fourfold repetition of all writing. It would be a useful addition to any school library.

A. J. H.

Physical Geography and Climatology. N. K. Horrocks. 14 × 22 cm. xv + 368 pp. London: Longmans, Green and Co. 1953. 18s.

The periodic crises which the physical basis suffers in scope, treatment, and emphasis are well recognized phases in the history of our teaching. This book is an important attempt, at such a time, to provide a modern account of our "underlying discipline and control". Any new text if it presumes to instil the spirit of resurgence into our subject at advanced level must seek the freshest presentation and the skilful blending of recent theory with the ultra-familiar. Although there is much to commend, the book does not entirely fulfil these exacting requirements.

Serious general criticisms can be made of omissions, overdue compressions, obscurities, confusions of fact, and lack of liaison 'twixt text and illustration, not all of which can honestly be considered to derive from scope as compared with length, nor which conceivably fall within the category of differences of opinion as to selection and treatment. The sections on meteorology and climate are its best aspect: the diagrams are perhaps its worst. In the attempt in these to be bold and simple, reality has been lost. Not a few deserve the designation "scrappy" and it is these particularly which give least pleasure on turning the pages. Conversely the photographs are well chosen (especially those of vegetation types) and are adequately reproduced. A verdict by comparisons must conclude that whilst certainly the most concentrated as well as comprehensive book of its kind, it is not as sound as Lake for the normal advanced course, nor as safe as parts of Finch and Trewartha for scholarship students.

Its subdivisions are as follows: 1. Structure of the earth's surface, 2. Earth sculpture, 3. Meteorology, 4. Plants and soils, 5. Climatology and 6. Oceanography. Section 3 gains most credit for the author where the complexities of air masses and the rôle of water vapour in the atmosphere are capably handled by recourse to many graphs of comparative lapse rates. The necessary leap forward which the student must make from the concept of three types of rainfall to the mechanisms of air mass stability is painlessly achieved. Indeed the formal mention together of the

ELECTION OF HONORARY TREASURER

The death on 28th November 1955 of our Honorary Treasurer, the late Sir William H. Himbury, created a vacancy that was filled by the election at our Council meeting held on 4th January, 1956 of Professor L. Dudley Stamp, C.B.E., to that office. On many occasions Professor Stamp has given invaluable advice and practical assistance to the Association; he has served as President in 1950 and is a Trustee and member of the Finance Sub-committee. We are indeed fortunate in ensuring the active continuance of his gifted and generous help in this important office.

ELECTION OF PRESIDENT FOR 1957

We are glad to inform members that Professor P. W. Bryan, formerly Vice-Principal and Head of the Department of Geography at University College, Leicester, has accepted nomination and was elected by Council to the office of President for the year 1957, in succession to Lord Nathan now in office. Professor Bryan is a longstanding friend of the Association and we are very proud to honour him in this way.

ELECTIONS TO COUNCIL

At the Annual General Meeting held on 5th January, 1956 the following members were elected to fill vacancies on Council: Mr. W. C. Chapman (York Branch), Miss P. A. Nicklin (Birmingham Branch), Mr. G. A. Vincent (Westminster Branch) and Mr. H. C. Wilks. Miss Nicklin was elected by Council to serve on the executive committee.

REPORT OF BRANCH SECRETARIES' CONFERENCE 25TH JUNE, 1955

The following is a résumé of a report on the first meeting of Branch Secretaries prepared by the convener and chairman, Mr. W. R. A. Ellis.

Forty-two members, representing 36 branches, attended the meeting which was held in Sheffield at headquarters. Representatives learned at first hand routine headquarters-office procedure and were able to consider branch organization in relation to this. The problems of branches were then discussed with particular reference to the special difficulties of rural branches, which have a very scattered membership, lack concentration of schools and are remote from academic centres. Possible solutions of some of these problems were illustrated, e.g., the rotation of centres for meetings, the arrangement of joint meetings with other branches. The remarkable achievements of some of the larger branches (e.g., Liverpool, Birmingham) in organizing meetings, excursions, advertisement, increasing membership, etc. may well prove to be a stimulus to others less favourably situated or, as yet, less skilfully developed.

One of the most interesting features of the conference was the demonstration through maps prepared by the conference convener of the "catchment areas" of existing branches, of the areas in Britain for which no branch coverage exists and of the distribution of branch and non-branch members. It emerged from these investigations that not only are there some 2,000 members registered at headquarters who are not recorded as members of branches, but, of these, no less than 1,700 live within Branch areas, only about 250 members having addresses on headquarters records outside present branch coverage. The maps also showed that there is an urgent need for the extension of existing "catchment areas" so that neighbouring branches have common boundaries; or, where that extension is impossible, for the creation of new branches. The localities suggested for new branch development are Tyneside, Durham, Southern Lakeland, Preston-Fylde, Upper Ribblesdale, Cheshire

Plain—Welsh Border, Central Wales, Herefordshire and Border, Gloucester—West Cotswolds, East Lincolnshire, Fens—Peterborough, Northants, Tamar Valley (Plymouth), Northwest Devon, Vale of Dorset, Vale of Swindon—East Cotswolds, Southampton, Central Weald, Hastings, East Kent (Canterbury), Southeast Essex. Any members or group of members in these areas who are interested in the possibility of creating or reviving branch activities should write to headquarters for advice on procedure in this matter. (Announcements about proposals for new branch formation are published from time to time in these notes.)

We earnestly hope that, arising from Mr. Ellis's energetic efforts and the enthusiastic response of the representatives who attended the conference, the Association will see both the fuller integration of members into the framework of existing branches, with the creation of many new branches, and a substantial increase in membership resulting from the nation-wide drive which branch officers plan to make. We extend to Mr. Ellis and to all who contributed to the success of this meeting our thanks.

ANNUAL CONFERENCE, 3RD TO 6TH JANUARY, 1956

Once again we enjoyed the hospitality of the London School of Economics for our Annual Meetings and Conference and warm thanks are due to the Director for continuing this generous help that has been given to the Association through a period of no less than 30 years. The conference was a vigorous one in every sense of the word; it is difficult to assess how many members attended, but lecture theatres were always full or indeed overcrowded. The attendance at the Annual Dinner was also a record gathering of 110 members and guests.

The plan of the conference differed from that of earlier annual meetings in that the programme included a series of lectures on various aspects of the geography of the London Basin, with related excursions on the last day. The subjects of the London lectures were Aspects of London's Prehistory by Professor W. F. Grimes; the Problem of London's Drainage by Mr. A. F. Green; the Port of London by Dr. J. H. Bird; the Rôle of London in the Industrial Geography of Great Britain by Dr. M. J. Wise; Agricultural Geography of the London Basin, past and present, by Dr. H. C. K. Henderson; and the Development of London's early Railways in relation to the physical basis by Professor S. W. Wooldridge. It is hoped that we shall be able to publish some at least of these papers.

In addition the programme included a lecture by Professor A. L. Banks on Some Medical Aspects of Geography, at a joint meeting with the Institute of British Geographers and the Royal Geographical Society at the Society's House where once again we received generous hospitality and refreshment. Our President-elect, Professor P. W. Bryan; delighted a large audience with Kodachrome films and commentary on Snowdonia and Anglesey, and Professor A. E. Smailes reported fully on the Summer School held in 1955 at Aix-en-Provence; his report virtually embraced a series of local regional studies in the south of France.

Teaching problems were not forgotten and a packed audience listened with great interest to Dr. Dury's discussion, from the examiner's point of view, of mistakes on river development commonly found in G.C.E. scripts. The Secondary Schools Section in co-operation with the Training Colleges Section discussed "Sample Studies", including a demonstration lesson given before a very large audience by Mr. D. J. Cadman.

This was indeed a conference of many "records," whether of the size of audiences, of the number of coaches required for the excursions, of the number of members in residence at Campbell Hall, or of the number attending the dinner. Mr. R. C. Honeybone was on this occasion for the first time solely responsible for organizing our conference and we congratulate him on the remarkable success of this meeting. To the speakers and lecturers we extend warm thanks, and in special measure may

Background Books

ARCTIC WHALING ADVENTURES

By MICHAEL HYDE. *Pp.* 126, *with* 37 *black and white illustrations.* For ages 10–14. 6*s.*

MAN AGAINST MAN-EATERS

By JIM CORBETT. (*English-Readers' Library.*) *Paper covers* 4*s.*; *Cloth boards* 5*s.* 6*d. net.*
Abridged from MAN-EATERS OF KUMAON and THE MAN-EATING LEOPARD OF RUDRAPRAYAG (*each* 9*s.* 6*d. net*).

MY INDIA

By JIM CORBETT. *Pp.* 204, *with maps.* 10*s.* 6*d. net*

JUNGLE LORE

By JIM CORBETT. *Pp.* 184, *with half-tone plates.* 10*s.* 6*d. net*

THE TEMPLE TIGER: AND MORE MAN-EATERS OF KUMAON

By JIM CORBETT. *Pp.* 204, *with* 10 *half-tone plates.* 12*s.* 6*d. net*

TREE TOPS

By JIM CORBETT. *Pp.* 48, *with* 25 *illustrations.* 6*s. net*
A story of the visit paid by Her Majesty the Queen to Kenya in 1952.

FICTION

A FORTUNE FOR THE BRAVE

By NAN CHAUNCY. Illustrated by Margaret Horder. Tasmanian setting. For ages 10–13. 8*s.* 6*d. net*

AMBARI!
SHIFTA!

By R. FORBES-WATSON. Illustrated by Joan Kiddell-Monroe. *Pp.* 144. African setting. For ages 9–13. *each* 8*s.* 6*d. net*

SAMA (Awarded the 1950 Prix Jeunesse)
SIRGA OWORO KPO THE LEOPARD

By RENÉ GUILLOT. Illustrated by Joan Kiddell-Monroe. Translated by Gwen Marsh. African setting. For ages 8–12.
each 8*s.* 6*d. net*

THE WIND OF CHANCE

By RENÉ GUILLOT. Illustrated by Pierre Collot. Ivory Coast setting. For ages 11–15. 9*s.* 6*d. net*

THE MOON OF SNOWSHOES

By DONALD SUDDABY. Illustrated by Leonard Rosoman. Central American setting. For ages 11–15. 10*s.* 6*d. net*

Prices are subject to alteration without notice

Further suggestions will be sent on application to the

OXFORD UNIVERSITY PRESS
Education Department **Oxford**

three types is reserved for a brief final chapter on rainfall distribution where they find a rightful place. Likewise in the section on climatology where the systematic conclusions of sections 3 and 4 are combined, developed and regionally applied under a simplified form of the Köppen classification, the suspected close relationship of climatic averages, plants and soils (on maps at atlas scale) is saved from crude over-emphasis by merited consideration of the individuality of each regional example of a "climate-vegetation-soil" complex. The result is a series of 'natural regions' not according to some uncompromising system but with each factor given balanced appraisal.

On the debit side however stands a total list of defects in text and diagrams which is formidable. Whether or not they overmatch the book's certain merits, it is difficult to decide. Three examples must suffice.

Chapter V on the work of rivers is a detailed compilation, but at the moment it offers no befitting sequence of stimulations towards imaginative thinking. Similarly the outline of the cycle of erosion, which is a bare minimum, would benefit by simple cross-sections and block diagrams (of which there is an *embarras de choix*) in order to illuminate the relations of valley forms to the landscape as a whole throughout the cycle. Another unwarranted contraction is the dismissal of off-shore bars as "similar to spit formation". Here again is scope for careful explanation and a dire necessity for Johnson's fine diagrams, albeit simplified.

Thus revision and expansion at the cost of brevity are called for, for at present this is not a work which can be left alone with the student. For example, one could scarcely find a better illustration of the careless employment of work-a-day usage than the term "settling down" by which to describe the stabilization of Alpine mountain regions after their earlier paroxysms.

R. W. C.

The following books, which may be consulted by members, have been received or purchased by the Library of the Association.

The Concept and Content of Modern Geography. F. J. Monkhouse. Inaugural Lecture, Department of Geography, University of Southampton. 31 pp. 1955. 2s. 6d.

The Name and Nature of the British Commonwealth. N. Mansergh. Inaugural Lecture, Smuts Professor of the History of the British Commonwealth, University of Cambridge. 31 pp. 1954. 2s. 6d.

Object and Method in Geographical Studies. Norman Pye. Inaugural Lecture, Department of Geography, University College of Leicester. 19 pp. 1955. 1s.

Research in Geography. W. G. V. Balchin. Inaugural Lecture, Department of Geography, University College of Swansea. 23 pp. 1955.

The Historical Association, 1906–1956. The origin and history of the Historical Association, published on the occasion of its Jubilee. 56 pp. London: G. Philip and Son. 1955. 2s. 6d.

Journey into Wonder. N. J. Berrill. 320 pp. London: Gollancz Ltd. 1953. 13s. 6d. An account of exploration and travel from the fifteenth to the nineteenth century and of the extension of knowledge of the geography of the world and of animals.

Elizabethan Venture. C. Tragen. 158 pp. London: Witherby Ltd. 1953. 10s. 6d. The travels of John Newbery and Ralph Fitch in Asia, 1579–1611.

The Traveller's Year. Elizabeth Nicholas. 262 pp. London: Evans Brothers Ltd. 1954. 12s. 6d.

An Introduction to Mapwork and Practical Geography. J. Bygott. 251 pp. London: University Tutorial Press. 1955. 14s. 6d. In this fifth edition of a well-known book, there are, in addition to minor revisions in the text, an example of the

Seventh Series One-inch O.S. map and an account of the new system of National Grid references.

Miniature Landscape Modelling. J. H. Ahern. 133 pp. London: Percival Marshall. 1955. 10s. 6d. Intended for the professional or commercial user, this book will provide much practical help for the geography teacher.

A Description of Ordnance Survey Large Scale Plans. Director General, Ordnance Survey, Chessington, Surrey. 21 pp. 1954. 2s. The latest edition of the booklet describing maps and plans on scales from 1 : 500 to 1 : 2,500; chapter v gives full information about the procedure for obtaining O.S. publications.

Climatology. A. Austin Miller. 318 pp. London: Methuen. 1953. 21s. Eighth edition, revised and re-set.

The Climates of the Continents. W. G. Kendrew. 607 pp. Oxford: Clarendon Press. 1953. 50s. Fourth edition, revised and enlarged to include new data.

The Geography of the Flowering Plants. R. Good. 452 pp. London: Longmans Green. 1953. 50s. New (revised) edition.

Walt Disney's *The Living Desert* and *Vanishing Prairie.* Jane Werner. Both 124 pp. London: Rathbone Books. 1954 and 1955. 8s. 6d. and 9s. 6d. Based on the documentary films made in the Great American Desert and the Great Plains, both books contain many colour and black and white illustrations of plants and animals.

The Limits of the Earth. F. Osborn. 175 pp. London: Faber and Faber. 1954. 12s. 6d. A survey of the world's food resources.

Commonwealth Economic Committee. Statistical Reviews of *Dairy Produce* (1953), *Meat* (1954), *Plantation Crops* (1955), *Industrial Fibres* (1955) and *Grain Crops* (1955). London: H.M.S.O. 5s. each. *Commonwealth Trade* 1954–5. A memorandum summarizing certain of the more important changes in Commonwealth trade during 1954–5. London: H.M.S.O. 1955. 1s. 6d.

The University Teaching of Social Sciences: Sociology, Social Psychology and Anthropology. Reports published by U.N.E.S.C.O. 252 pp. 1954. 10s. 6d.

Shorter Oxford School Atlas. Cartographic Department of the Clarendon Press. 60 pp. and endpapers. Oxford: Clarendon Press. 1956. 6s. 6d. (stiff boards). A selection of maps from the Oxford School Atlas published in 1955.

Report on the National Agricultural Advisory Service, 1946–54. 62 pp. London: H.M.S.O. 1955. 3s. 6d.

Forestry Commission Census Report No. 5. Census of Woodlands 1947–49; woods of five acres and over. English County Details. 270 pp. London: H.M.S.O. 1953. 12s. 6d. Supplementary to Census Report No. 1, published in 1952.

Structure, Surface and Drainage in South-East England. S. W. Wooldridge and D. L. Linton. 176 pp. London: G. Philip and Son. 1955. 17s. 6d. A reprint, with revisions, of the monograph published by the Institute of British Geographers in 1939.

Bolton Survey. C. H. Saxelby (editor). 140 pp. Bolton: Bolton Branches of the Geographical and Historical Associations and Bolton Field Naturalists Society. 1953. 8s. 6d.

Roman and Saxon Withington. A Study in Continuity. H. P. R. Finberg. 40 pp. Dept. of English Local History, University College of Leicester, Occasional Papers No. 8. 1955. 6s.

Settlement Patterns in Rural Flintshire. D. Sylvester. 27 pp. Reprint from Transactions, Flintshire Historical Society, 1954–5.

North-Eastern England. Population movements and the landscape since the early 19th century. J. W. House. Dept. of Geography, King's College, University of Durham Research Series No. 1. 1954. 5s.

De Bevolkingsspreiding op het Hollandse Platteland in 1622 en 1795. (Distribution of population in the Dutch countryside in 1622 and 1795.) A. C. de Vooys. 15 pp. Publication No. 10 of the Geogr. Instituut, Universiteit te Utrecht. 1953.

Oberösterreich in der Bevölkerungsentwicklung Osterreichs 1869–1951. H. Maurer. 55 pp. Oberösterreichischen Heimatatlas. Linz. 1953.

Iron Ore Production at Kirkenes, Norway. T. Lloyd. 39 pp. Dartmouth College, U.S.A. Technical Report. 1954.

Bergens Kommunikasjoner med Nabofylkene. S. Malmo and T. Sund. 55 pp. Bergen: Norges Handelshøyskole. 1954.

Industries of Norway. Technical and Commercial Achievements. O. J. Adamson (editor). 392 pp. Oslo: Dreyer Forlag. (Ed. Stanford Ltd. in London.) 1952. £5 5s.

Iraq Oil in 1954. Iraq, Basrah and Mosul Petroleum Companies. 34 pp. London. 1954.

Bibliography on Southwestern Asia. H. Field. 106 pp. Miami: University of Miami Press. 1953.

The World in Colour Series. D. Ogrizek (editor). *Greece* (416 pp.) 1955. *North Africa* (448 pp.) 1955. *South and Central Africa* (432 pp.) 1954. London: McGraw-Hill. 30s. each.

Desert and Forest. L. M. Nesbitt. 336 pp. Harmondsworth: Penguin Books. 1955. 2s. 6d. An unabridged reprint of the book first published in 1934.

Livingstone and Africa. Teach Yourself History Series. J. Simmons. 180 pp. London: English Universities Press Ltd. 1955. 7s. 6d.

Into the Blue. The Lake Tana Expedition 1953. L. Ferguson. 255 pp. London: Collins. 1955. 16s. A students' expedition to the source of the Blue Nile.

The Trade of Lake Victoria. V. C. R. Ford. 66 pp. East African Institute of Social Research, Kampala, Uganda, East African Studies No. 3. 1955. 11s.

The Gambia. The Story of the Groundnut Colony. Lady Southorn. 273 pp. London: Allen and Unwin. 1952. 21s.

Ethnographic Survey of Africa. C. Daryll Forde (editor). East Central Africa, Part I: *Peoples of the Lake Nyasa Region* by M. Tew. 131 pp. 1950. 10s. 6d. Western Africa, Part I: *Akan and Ga-adangme Peoples of the Gold Coast* by M. Manoukian. 110 pp. 1950. 8s. 6d. Western Africa, Part III: *The Ibo and Ibibio-speaking Peoples of South-Eastern Nigeria* by D. Forde and G. I. Jones. 94 pp. 1950. 7s. 6d. London: Oxford University Press for the International African Institute.

The Bantu Tribes of South Africa. Reproductions of photographic studies by A. M. Duggan-Cronin. Vol. iii, section v, plates cliii–cxcviii: The Nguni. With an introductory article on the Baca, Hlubi and Xesibe by W. D. Hammond-Tooke. Cambridge: Deighton, Bell and Co. Kimberley: Alexander McGregor Memorial Museum. 1954. 42s.

Yearbook and Guide to East Africa; *to Southern Africa*; 1956. A. Gordon-Brown (editor). London: Robert Hale for the Union-Castle Mail Steamship Co. Ltd. 7s. 6d. and 9s. 6d. respectively.

Atlas of Sierra Leone. Survey and Lands Department, Freetown, Sierra Leone. 16 + iv pp. London: Ed. Stanford Ltd. 1953.

Selected Bibliography of Canadian Geography with Imprint 1953. Dept. of Mines and Tech. Surveys, Bibliographical Series No. 14. 61 pp. Ottawa. 1955. 50 cents.

Readings in the Geography of North America. A selection of articles from the *Geographical Review.* American Geographical Society Reprint Series No. 5. 466 pp. New York. 1952.

Gully Erosion in the Brecon Beacons Area, South Wales

TREVOR M. THOMAS

In the past few decades the problem of gully erosion with consequent loss of valuable agricultural land has received much attention in both tropical and mid-latitude countries. Within the British Isles such losses are either negligible or occur on a limited scale as the aftermath of attempts to rehabilitate land affected by opencast mining. Nevertheless, the important role played by gullying in the normal erosion process is clearly evident in all the major upland areas of the country. This is particularly prominent in the Brecon Beacons area of South Wales; here factors of elevation, heavy rainfall, the presence of drift-filled, major, upland valleys and a relative paucity of rock exposures favour a greater degree of incision of drainage channels than can be seen on most other high moorland tracts.

Physical background.

The area of survey lies on an Old Red Sandstone base and, except for a small portion in the west which forms the eastern edge of Black Mountain, is wholly located within southern Breconshire. Six-inch mapping was undertaken over the group of uplands centred on Fforest Fawr and including the Brecon Beacons and the easternmost section of Black Mountain. These range over an east–west length of nearly 20 miles and a maximum north–south width of 9 miles. The results of this survey are embodied in Figs. 1 and 2.

This Old Red Sandstone tract forms a major divide for the streams draining northward to the Usk system and those streams forming the headwaters of the Twrch, Tawe, Neath, Taf Fawr and Taf Fechan systems of southerly flow. Structural controls are such that north to south cross-profiles are nearly everywhere asymmetrical showing magnificent, northward-facing, craggy escarpments and long, southerly-graded, dip slopes. For long stretches the thalwegs of the southward-flowing streams are almost perfect replicas, at a lower level, of the axial profiles of the intervening long spurs. A considerable area exceeds 2,000 feet O.D., culminating in Pen-y-fan (2,906 feet), the highest Old Red Sandstone summit in England and Wales. West of the Taf Fawr valley the most prominent peaks are Fan Fawr (2,409 feet), Fan Llia (2,071 feet), Fan Nedd (2,177 feet), Fan Gihirych (2,381

➤ Mr. Thomas, who is an Assistant Research Officer in the Welsh office of the Ministry of Housing and Local Government, Cardiff, has extended his work on the gullying of restored opencast coal sites to consider the geomorphological significance of gully phenomena in the Brecon uplands.

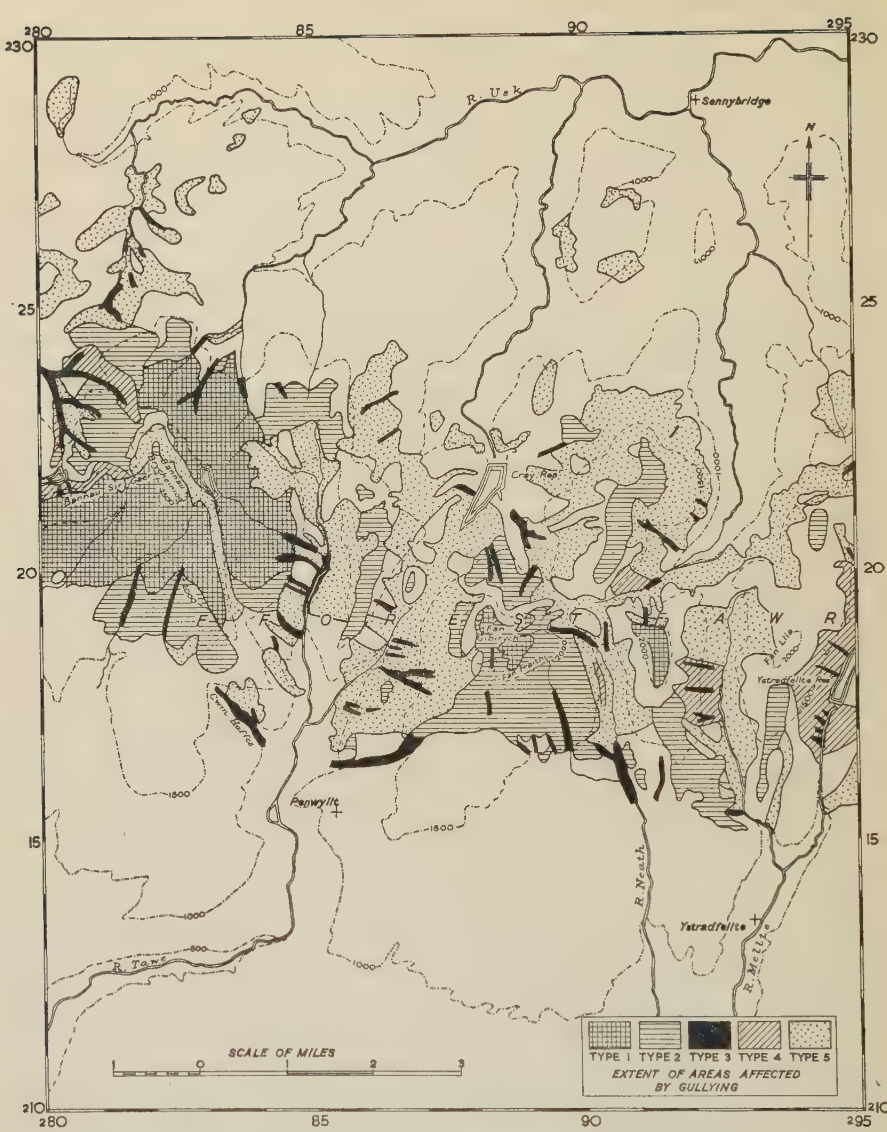


Fig. 1.—Map showing the extent of areas affected by gullying in the Fforest Fawr upland.

feet) and Bannau Brycheiniog (2,632 feet). The northern escarpment loses some of its prominence where northward-projecting spurs separate individual cirques; these formerly must have borne corrie glaciers.

The Old Red Sandstone beds exposed in the area have a combined thickness of approximately 2,500 feet. Reading downwards from the base of the Carboniferous Limestone, which forms a roughly parallel but much narrower belt of broken upland country to the south, the divisions of this formation comprise the Grey Grits (with a thickness of 0 to 200 feet; absent in the west), the Brownstones (up to 1,450 feet

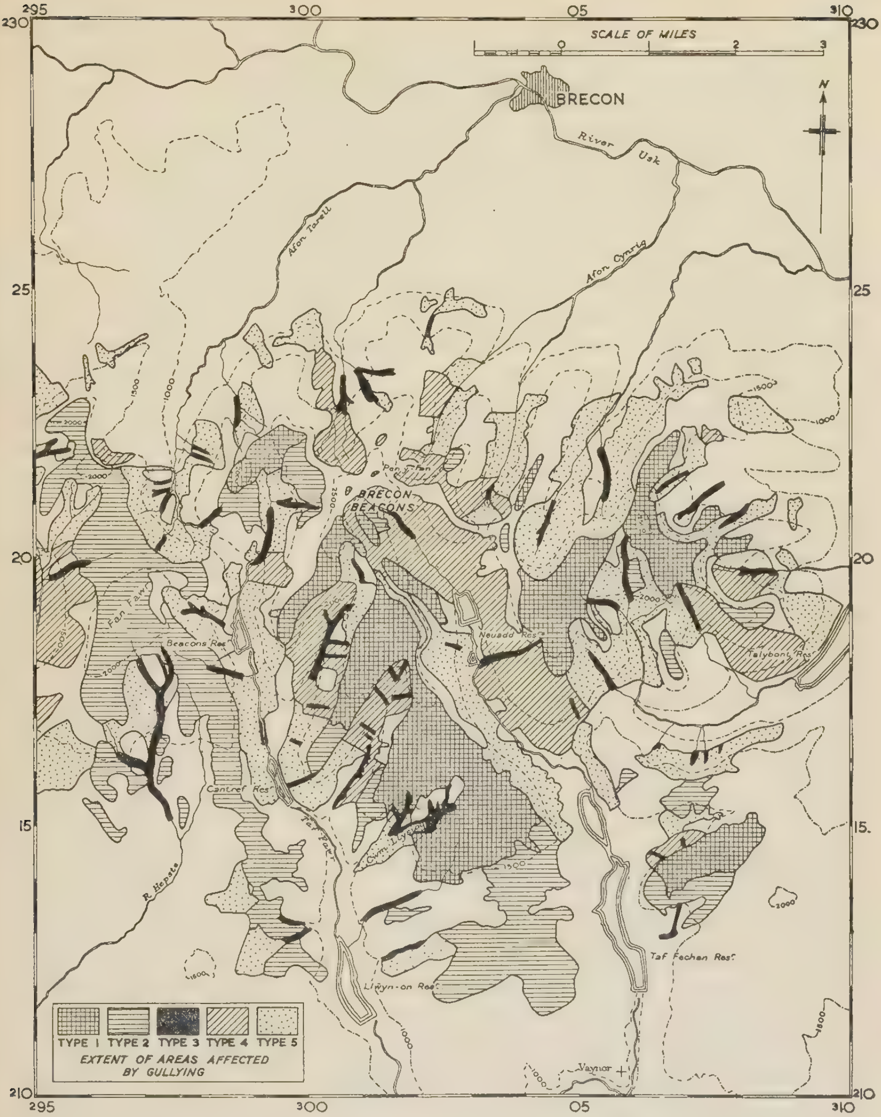


Fig. 2.—Map showing the extent of areas affected by gullying in the Brecon Beacons and their environs. On many of the higher points a former peat cover has been removed by erosion so that gullying is no longer evident.

thick) and the Senni Beds (up to 1,000 feet exposed in the northern valleys draining to the Usk[1]).

The Brownstones, consisting of alternate bands of red sandstone, shale or marl, are the dominant group. Their uppermost 20 to 50 feet, showing tough, gritty and flaggy red sandstones, are known as the Plateau Beds, as despite their limited thickness they give rise to the wide stretches of plateau scenery so characteristic of the Beacons country. Glacial drift occurs on all but the highest elevations, and consists wholly of Old Red Sandstone detritus in the form of irregular pebbles or small boulders, red marly bond and in places gravel or coarse sand. On the lower slopes of some of the major valleys this material is more than 60 feet thick. Small peat bogs are found in the hollows between drift mounds whilst the long dip slopes, even to the edge of the escarpment crags, usually have a cover of hill peat.

Average annual rainfall everywhere exceeds 60 inches. Practically all the ground above the 2,000-foot contour line receives more than 80 inches, whilst two small areas, largely coincident with Fan Gihirych and Bannau Brycheiniog, are enclosed by the 90-inch isohyet. Day to day weather conditions are characterized by a greater frequency and intensity of showers, particularly under unstable north-westerly polar air conditions, and a higher incidence of summer thunderstorms than is found in adjoining areas of lower relief.

Details of gullying.

Above 1,500 feet O.D. rather more than 80 per cent of this upland region shows some form of gullying. An attempt has been made to categorize this into classes, in each of which gullying shows a large measure of similarity in intensity and form over the wide area investigated. Five main associations of gullying have thus been determined and are listed below:—

Type 1. Peat-covered, upper slopes with irregularly dendritic patterns of gullies which have reached a mature stage of development.

Type 2. Peaty tracts showing numerous shrinkage cracks or minor irregularities, but in which gullying is largely in the incipient or very youthful stage.

Type 3. Deeply-incised sections of main streams showing frequent slumping of high banks of bouldery drift.

Type 4. Steep slopes of glaciated valleys with close systems of parallel shallow gullies.

Type 5. Lower spurs or valley slopes with open systems of shallow gullies largely coincident with permanent minor lines of drainage.

The distribution and essential features of each of these types will be discussed in turn. (*See also Plates I and II.*)

Type 1.

This form of gullying can be seen to a limited extent where a peat cover has developed on drift-covered Carboniferous Limestone and Millstone Grit, but it is essentially a feature of the dip slopes of the Old Red Sandstone terrain. It occurs at elevations ranging from about 1,400 feet to the highest point of the upland (2,906 feet). It may be observed to best advantage in the series of spurs of southerly gradient which diverge from the rib of high ground between the Taf Fechan and Taf Fawr valleys, and also on the elevated dip slope grading southward from Bannau Brycheiniog. On these and over other slopes of lesser extent, where surface gradients average 1 in 12 to 1 in 18, peat cover is practically universal. It extends to the precipitous edge of the northern escarpment, whilst above the deeply-cut tributary valleys it terminates in irregular fashion about the line of greatest slope change.

Gullying is best developed near the axial areas of these spurs and in other areas showing uniform slope over distances of 1 to 2 miles. Peat thickness may range up to 15 feet. A typical gully shows vertical banks of peat some 4 to 8 feet high separated by a relatively flat floor with a width of 5 to 10 yards. Peaty gleys or a slightly podzolized thin soil and subsoil cover to the bedrock are often exposed on the floors of the gullies. In some instances the underlying solid formation—usually flaggy sandstones or heavy-textured marls—is also seen. Locally the widths of the gullies are reduced to 10 to 15 feet when overhanging sides may produce frequent falls of peat.

Near its termination above the northern escarpment or the steep slopes forming the upper flanks of the major tributary valleys the peat cover has been eroded into tabular mounds or haggs. These are so disposed as to fringe irregular basins some 50 to 100 yards across. Showing numerous ramifications the basins are floored with redistributed peat, the continuity of which is broken by detached minor blocks of flaggy sandstone or limited extents of glaciated rock pavements. After periods of rain many of these basins drain over the lip of the escarpment and this gives rise to a distinctive etching of the latter feature. Where such basins abut on the steep upper slopes of tributary valleys this drainage initiates gullies which normally run in a direct line to the floors of the valleys.

There are indications that gully courses in this blanket peat define the lines of former subterranean seepages. Although the gullies are nearly always waterless the erosive process is a rapid one. When dry easterly winds of anticyclonic spells predominate, aerial transportation of particles of crumbly peat exposed in the gully banks is often evident. Prolonged rainfall or sharp downpours are liable to produce local changes of configuration with the evolution of branch gullies, whilst frost-heaving undoubtedly assists in the formation of fresh peat exposures. With advancing maturity of the gullying cycle the original peat blanket is more and more reduced so that in the final stages a few rectangular piles of peat with some surviving tussocks of cotton grass (*Eriophorum vaginatum*) are surrounded by a thin layer of redistributed peat partially covering the solid or subsoil base. Rock debris temporarily covered by peat often, on re-exposure, has a striking bleached-white appearance. Deep peat usually persists in swampy hollows which may dry up in summer to reveal cracked and crumbly surfaces.

Type 2.

It might be argued that the distinction between this type and the preceding one is very arbitrary, being one of degree or stage rather than involving any marked physical difference. The boundaries between the two are, however, nearly everywhere quite sharp. In these areas peat surfaces show frequent minor irregularities in the form of ill-defined steps and shrinkage cracks but relatively few peat profiles or gullied storm drainage channels. Shallow irregular basins are a feature, these being bordered by a chaotic series of tilted low mounds. Areas characterized by such surface forms include the slopes leading southward from Fan Fraith and Fan Fawr.

Undisturbed deep peat normally has a cover of almost pure cotton grass with little inequality of surface so as to present a uniform or "meadow" appearance. A preliminary sign of impending gully erosion is a change in the habit of the cotton grass so that the peat moor takes on a "tussocky" aspect. In the areas round the tussocks the peat surface cracks and crumbles and may be invaded by heather or wimberry or varying proportions of the two. Such a mixed floral community typifies a peat blanket which has just reached the stage when its state of equilibrium is upset so that with "bursting" and drying a cycle of gully erosion begins.

Type 3.

Spectacular gullying, as known in many tropical countries, is confined to the courses of main streams. As indicated earlier the floors and lower slopes of the major valleys and most of the tributary valleys bear a superficial cover of bouldery drift ranging to upwards of 60 feet in thickness. Post-glacial incision of the steeply graded tributary streams into this relatively soft unstratified deposit has produced gorge-like courses, which are continually modified by slumping. The attainment of the bedrock by down-cutting and the acquisition of a full vegetative cover on the scarred slopes above might be regarded as heralding a period of general stability. This may be so under normal weather sequences, but when very special sets of climatic conditions are operative (such as sudden thaws with heavy rainfall after prolonged frost) a sudden sheet erosion of considerable magnitude is very apt to take place. Hillside slips of this nature have occurred in successive winters along many of the stream courses.

Individual slips average 15 to 25 yards across and cause temporary blockage or diversion of the stream channels. The finer elements are soon washed away and the pebbly constituents are carried down by successive floods to build up the coarse fan deltas so prominently displayed at many of the junction points with the main valleys. Major scars, the aftermath of a series of slips of the largest order, may be seen on the northern slopes of the deep trench of the Haffes valley, a right bank tributary of the upper Tawe. One such slip of recent occurrence has bodily removed pebbly drift from a steep slope some 200 feet high.

Type 4.

Gullies of this pattern typify the slopes of the heavily glaciated valleys which radiate from the highest points of the upland, such as Pen-y-Fan and Fan Fawr. These valleys are distinctly U-shaped in cross profile; their slopes, ranging from the thalwegs of the stream courses themselves to the axes of the bounding spurs, display little irregularity of surface. Thus gullies with average depths of 4 to 8 feet may run on parallel courses for distances of nearly a mile although only 15 to 25 yards apart. The intensity of gullying may be such that a traverse of 300 yards across the slopes of one of the valleys involves passage over 15 to 20 gullies. The frequency of gullies and the direct nature of their courses following the transverse lines of greatest gradient implies quick drainage with no great concentration of flood water along any one gully. Little deepening is thus evident except where they join main stream courses. New gullies may appear overnight after heavy storms when the carrying capacity of established drainage lines may be unable to deal with a greatly increased volume of flood water. Existing gullies are so well defined that the production of these rare additions is invariably related to the temporary obstruction of adjoining gullies.

Bands of well-bedded sandstones projecting from below the drift cover locally give rise to miniature waterfalls along the courses of these gullies after periods of rain.

Type 5.

On the slopes of those valleys in which the effects of glaciation have been largely depositional rather than erosional and where the cross-profiles do not show such sharp gradients, gullying is of an open dendritic pattern. Primary moundy drift, fans of coarse pebbly material and irregular terracing of re-sorted glacial deposits impose obstacles around which entrenched permanent or seasonal drainage lines must deviate. Direct courses to the valley bottoms are thus rarely cut, whilst under flood conditions extended or displaced gullying is much more common than was the case in the previous category. Spacing of gullies, however, is not nearly so close. The more devious courses result in individuals being deeper; towards the junction with the main valley stream they may be 10 to 15 feet deep. Where they exceed the latter figure they grade into gullies defined under Type 3.

Dating and correlation of gullying.

Practically all the gullying now evident is post-glacial; the physical properties of the bedrock did not favour widespread entrenchment of minor stream channels and any former surface irregularities of this nature were obliterated by till deposition.

Profiles of deep peat nearly everywhere reveal a sharp transition between the lower and upper layers. This junction plane marks the "Grenz Horizont" which has been recognized in many parts of northwest Europe, and is believed to be contemporaneous over the whole of this area. It provides a means of dating an abrupt climatic change from a fairly dry régime to a more moist one—from the relatively dry sub-Boreal to the wetter sub-Atlantic period. The beginning of the latter can be placed around 500 B.C. Associated vegetational changes, as preserved in the peat sections, involved a replacement of sphagnum bog, with some tree growth (especially birch) and heather, by cotton grass moor in which trees were entirely obliterated by swamping.

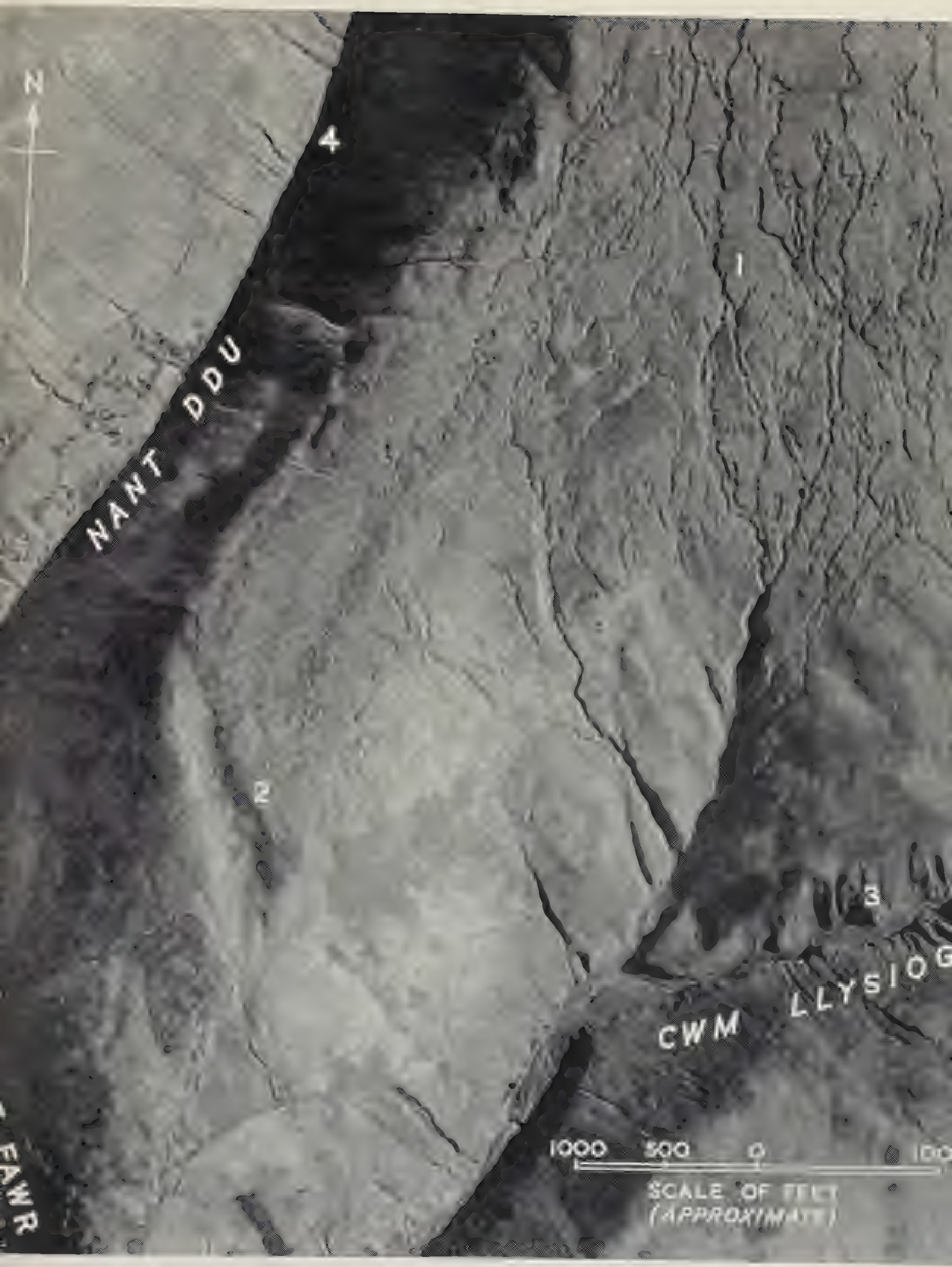
Representing a continuous accumulation of plant remains this peat blanket with its well-humified lower component and upper less-humified fibrous layers has taken some 5,000 to 7,000 years to form. Gullying was on a very limited scale or even entirely absent during the sphagnum bog stage. The same is true for the greater part of the period throughout which the upper peat was forming as this shows little variation in physical characteristics over wide areas. It follows, therefore, that the cycle of erosion in this peat cover commenced at a comparatively late date, probably within the past 500 years. Erosion within this comparatively short period has been so rapid that not only has it produced "inliers" of bedrock or subsoil within the peat blanket, but has also been responsible for the complete removal of peat over contiguous slopes of wide extent. (Note the irregular termination of the existing peat blanket above Cwm Llysiog in Plate 1.) Human interference, through burning and over-grazing of the coarse vegetative cover, no doubt assisted this process.

The gullying of glacial till and re-sorted material can be related to a post-glacial fall of base level. In some of the major valleys river terraces provide evidence of repeated falls of limited amplitude. These are particularly well defined in the upper Tawe valley where details remain to be worked out. Further south in this same valley the former standstills of these or earlier periods may also possibly be correlated with the levels of extensive cavern development within the Carboniferous Limestone.

There seems little doubt that gullying of this drift cover was initiated at a very early date; since that time repeated falls in base level have given it new leases of life. Evidence gained from the peat erosion phenomenon suggests that the present period corresponds with such a span of accelerated gullying.

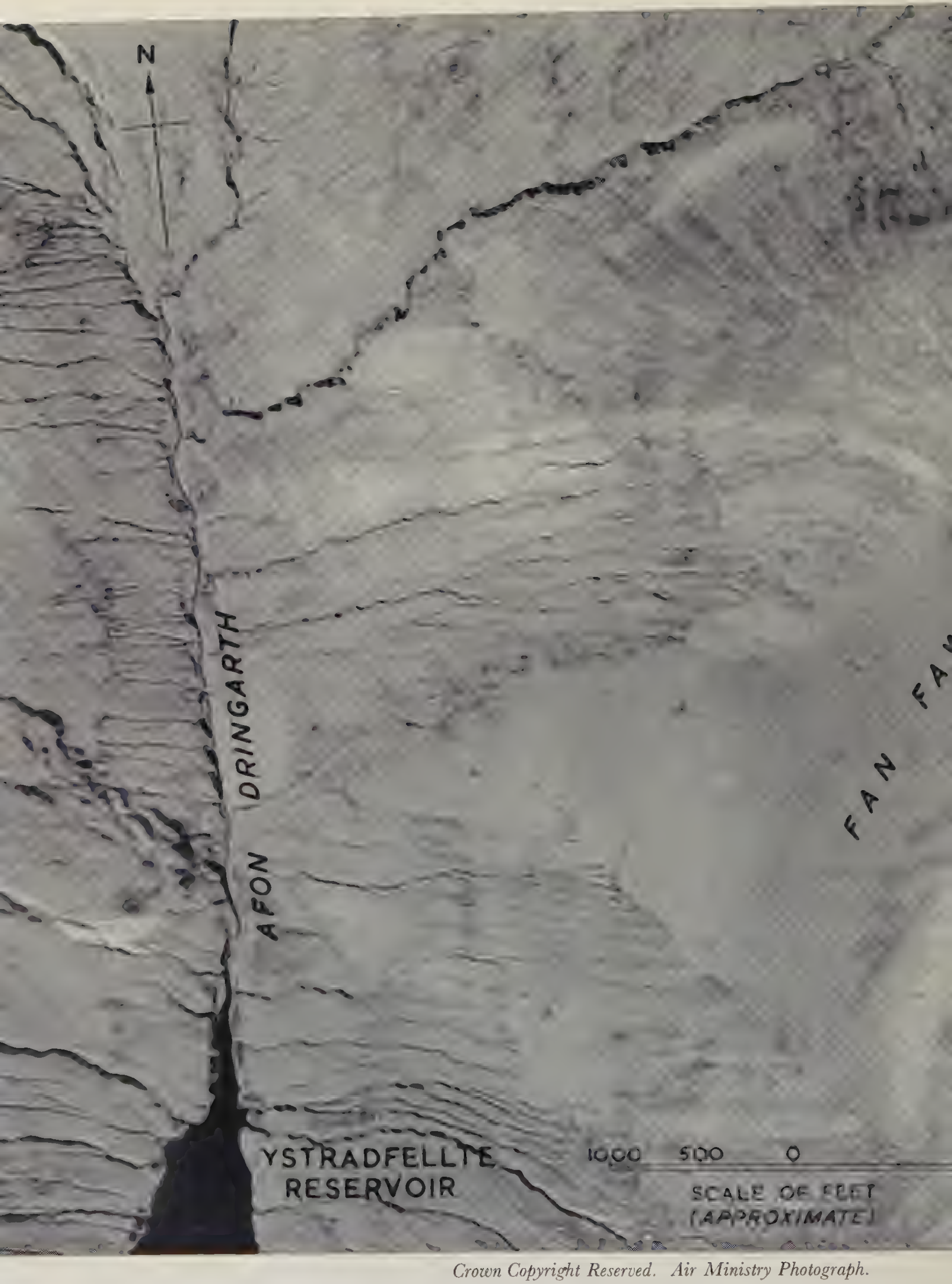
Gullying and land use.

From an economic or land-use standpoint, the most important function of the Brecon Beacon area lies in the utilization of more than 32,000 acres as catchment areas for several large reservoirs. These supply the major part of the water requirements of the large consuming authorities of Cardiff, Newport and Swansea, as well as several other local authorities ranging over much of the South Wales coalfield and its south-eastern fringe. The reservoirs have a combined net yield of over 60 million gallons per day. At certain points within the catchment areas, as in Cwm Llysiog, a left bank tributary of the Taf Fawr, active gullying, resulting in heavy loads of sediment during



Crown Copyright Reserved. Air Ministry Photograph.

Plate I. Typical developments of gullying classified as type 1, 2, 3 and 4 in or bordering on Cwm Llysiog and Nant Ddu Valley, left bank tributaries to the Taf Fawr.



Crown Copyright Reserved. Air Ministry Photograph.

Plate II. Close systems of parallel shallow gullies (type 4) in the heavily glaciated Dringarth Valley, 3 to 4 miles NNE. of the village of Ystradfellte. A landslide may also be noted to the north of the reservoir.

periods of flood, has necessitated the construction of silt filters. Although the consequences of gullying for water conservation are not yet serious, it is evident that in future more attention will have to be paid to the silting problem. Further schemes of reservoir construction have been mooted to meet the increasing demands of the growing populace and the expanding industry of the coalfield and its environs. Although certain parts of the existing catchment areas are very much under-reservoired there are technical difficulties confronting complete development for water supply purposes. One factor which has seriously curtailed the siting of new reservoirs is directly related to gullying, particularly of the category detailed under Type 3. This is the presence, near the junction points of many of the tributary streams with the main valleys, of great thicknesses of pebbly material in the form of fan deltas which in most examples are being continually enlarged.

As in other upland areas extensive tracts of land have been taken over for afforestation. Some sections of this acquired land coincide with the gullying zones. This liability to gullying has led to the exercise of greater care in planning the initial draining operations, particularly with regard to pattern and gradient (resulting generally in the construction of a close series of drains crossing the contours at a low angle so as to avoid, during periods of heavy rain, a strong flow over individual lengths). No cases of serious damage to established plantings by gullying have been recorded, but since wholesale fellings are not envisaged for some years no light has been thrown on the problem with respect to cleared areas. It is unlikely that future afforestation will extend into those sectors of the Beacons area showing gullying classified under Type 1, since these peaty upper slopes have an open aspect greatly exposed to the prevailing south-westerly winds.

Agricultural pursuits within the gullying zones are confined to pastoral activities, largely sheep grazing, ranging over the wide expanses of open moorland. Enclosed pastures on the lower slopes of the major valleys cater for winter shepherding and the rearing of store cattle which locally are allowed to summer graze the adjoining mountain land. Very limited acreages of this rough pasture are annually lost through gullying. To counterbalance this it has been noted that on the windswept high dip slopes the deeper gullies in the peat blanket are much used by sheep as shelter-belts during periods of high winds or sudden squalls.

Acknowledgements.

The writer wishes to record his thanks to Dr. F. J. North and Mr. H. A. Hyde, respective Keepers of the Geology and Botany Departments, National Museum of Wales, for discussions on this topic. An unpublished thesis by Mr. D. P. M. Guile, entitled "A Floristic and Ecological Survey of the Brecon Beacons and Black Mountains National Park," served as a valuable guide to the botanical background of this area. A copy of this is deposited in the Botany Department, National Museum of Wales.

REFERENCE

[1] T. Robertson in "The Geology of the South Wales Coalfield. Part V, The Country around Merthyr Tydfil," *Mem. Geol. Surv.*, 1932, p. 7.

A Scheme of Field Work throughout a School

Part II

H. C. WILKS

The second part of this article is an appendix to illustrate different aspects of the organization and administrative arrangements involved in field work as discussed in Part I. The illustration refers to a typical field journey by a Second Form to Hayes and Keston, Kent, from Norbury Manor Secondary Boys' School, Croydon.

1. *Instruction sheet for boys and parents.*

NORBURY MANOR SECONDARY BOYS' SCHOOL
GEOGRAPHY FIELD JOURNEY, No. R.4
FORM 2A
THURSDAY 24th MARCH 1955 to HAYES and KESTON, Kent

Please ask your Parents to read this, then keep it safely in your Geography Note-book.

1. Purpose of this Journey

We are going out to study the shape of the land in this area, and what happens on the land, i.e., what grows, and what people do. *The whole day is a working-day.* A village will be studied in detail, and either a farm, or a stretch of farm-land.

Maps must be well used all the time. Papers must be kept tidy and clean.

2. Group-work

Five groups as follows, to do special tasks.

Hardman .	These boys will be responsible for maps and equipment, and for safe custody of all information and specimens collected. Boys in these groups must loyally carry out the duties assigned to them.
Harvey . .	
Kane . .	
Bennett . .	
Stevens . .	

➤ Mr. Wilks is geography master at Norbury Manor Secondary Boys' School, Croydon. Part I of his article was published in the January 1956 issue of *Geography*.

3. TIME

Leave school 9.20 sharp.
By 59A bus to Addiscombe.
By train to Hayes (change at Elmers End).
Arrive at Hayes 10.31.
Walk to Keston (1 mile). Village study.
Lunch 12.30 to 1.30 (you can buy buns, cakes, tea).
Afternoon—Land Use Study (or Farm).
Return via Fox Hill.
Dep. Hayes 4.42. Arr. Addiscombe 5.9.
(Boys make own way home, but we pay fares.)

4. BRING

(i) *Substantial lunch.*
(ii) *Each boy*—2 tins, 2 paper bags, 1 yard string, map-board and clip. Pencils—H.B., Red and Blue.
(iii) *Detailed boys*—Trowels etc., as instructed.

5. WEAR

School uniform, scarves, gloves, *raincoat*—come prepared for weather. *Stout shoes* (walking 3 to 4 miles).

6. BEHAVIOUR AND DISCIPLINE

Working out of doors is different from being in a class-room. Please be sensible and helpful all day.

Boys are hereby warned—Any boy making himself a nuisance will be debarred from further work of this kind.

No litter or damage—A serious matter.
Sweets—only boiled sweets allowed. *No other eating.*

7. CONCLUSION

(i) Field-Work Folders will be started back in School.

(ii) Form 2A will be required to prepare sections of this year's Exhibition. One on "Keston", the other on "Lingfield" (the latter based on your second day out in May).

PLEASE DO YOUR BEST TO GET ALL YOU CAN OUT OF THIS DAY'S WORK.

The organization of these journeys is a considerable task, and loyal boys realize this and work hard.

H. C. WILKS,
Geography Master.

F. H. GLOGG,
Headmaster.

March 1955.

2. *Questionnaire to be filled up en route.*

Form 2a ANSWER THESE QUESTIONS WHILE ON THE BUS AND TRAIN
No. 1 WRITE NOTES VERY QUICKLY—USE PENCIL ONLY

Keep this sheet clean and safe

ON THE BUS

1. What railway routes does the bus cross over?
2. What is the tall tower-like building near the first bridge?
3. What is made in the big building with the clock-tower on top? (*left of first bridge*).

ON THE TRAIN

4. As you leave Addiscombe station what is made in the big factory on the *left*?
5. What is the name of the park beside Woodside Station?
6. Why is Woodside so called?
7. What is the big open land to the *left* of the railway after Woodside?
8. Name the hills seen *sharp right* of the train.
9. Suggest what is done in the *two factories just before Elmers End.*

CHANGE TRAINS AT ELMERS END

10. Where has the second train come from?
11. Describe the landscape as far *as next station* (*Eden Park*).
12. What sort of place is *West Wickham*?
13. What is the ground made of as we go on to Hayes?
14. What trees are growing in the cutting?

AT HAYES STATION

15. Which do you think is *the more important branch*, the Hayes branch or the Addiscombe branch?
16. Say *why* you think this is.
17. At *which stations* passed were there *coal-yards*?
18. What is the quarterly fare from Hayes to London?
19. Why is Hayes a modern station?
20. How many trains per hour from Hayes to London?
21. How many schools have we passed on the whole route?
22. How long does a train take from Hayes to London?

3. *Questionnaire to be filled in at odd moments during the day.*

Form 2a USE PENCIL ONLY—FILL THIS UP DURING THE DAY
No. 2

Keep this sheet clean and safe

1. Name six trees found growing on Hayes Common.
2. What are the official road numbers of the roads from:—
   Hayes Common to Croydon?
   Bromley to Westerham?

3. What other railway stations serve this area besides Hayes?
4. Where does the 146 bus go to?
    And the 410 bus?
5. What place does Hayes Common remind you of?
6. How is Keston Common different from Hayes Common?
7. In what direction does the escarpment face?
8. Estimate the gradient of Fox Hill.
9. What river used to flow through the gap near West Wickham?
10. Why is Hayes Common bare of trees near Hayes Station, and also at the Keston end?
11. In what direction does Keston lie from St. Paul's Cathedral?
12. What would be the *highest* you can see *north* of Keston?
13. What is the splash of new red houses you can see from the escarpment?
14. Would you say that new houses in this area are:—
    Still being built, *or*
    Stopped being built?
15. What might the steel masts be as you look *south* from the common?
16. Name the aerodrome near here.
    Why do you think it is here?
17. Did we cross a river in the train?
18. Would you say Keston is a warm place or a cold place in winter? Why?
19. Say how long it took us this afternoon going back from the "Fox Inn" to Hayes Station.
20. How many miles do you think we have walked today?

4. *Organizer's time-table for day.*

Form 2a

THURSDAY 24TH MARCH 1955—TO HAYES AND KESTON
TIME-TABLE

9.20 At School. Issue questionnaires. Final instructions.
9.30 59A Bus to Add. Sta.—boys to do questionnaire 1 en route.
10.4 Train: Addiscombe, change Elmers End.
10.31 Arr. Hayes. Discussion of route, built-up area near station. Check questionnaire 1. Issue questionnaire 2.
10.50 Hayes Common Gravel Pits—collect samples.
10.55 Tree-types (esp. holm-oak).
11.5 Escarpment, near Baston Manor. Discuss view.
11.15 Arr. Keston. "Fox".
11.15 to 12.30 Group work on village. Short conference at end. Meet at Windmill 11.45—view.
12.30 to 1.30 Lunch.

1.30 Continue walk via back road to lakes—note springs, valleys.
1.50 Caesar's Well } Early people here.
2.0 "Caesar's Camp" }
2.15 Old Oak—ancient forests.
2.30 Reservoir—View.
2.45 War Bank—Roman remains—Spring.
3.0 Church—materials, position.
3.15 Walk, via Jackass Lane—examine chalk in hedgerows; note view up main valley; land-use, orchards (siting), housing development.
3.50 Up Fox Hill (estimate gradient). Short break.
4.0 to 4.30 Across Hayes Common.
4.42 Train Dep. Hayes. Arr. Addiscombe 5.9.

IN VILLAGE

Group 1 (Hardman)	Age of buildings.
Group 2 (Harvey)	Shops and hotels, etc.
Group 3 (Kane)	Public transport, access.
Group 4 (Bennett)	Public services—P.O., Police, Local Government.
Group 5 (Stevens)	Decide how village has grown.

In charge of maps, papers, etc.: Francis; Miles.

CONCLUSION

Every journey taking place in the first three years requires duplicated material comparable to the foregoing example; but in the Fifth Forms only an instruction Sheet is issued.

Certain points should be emphasized:—

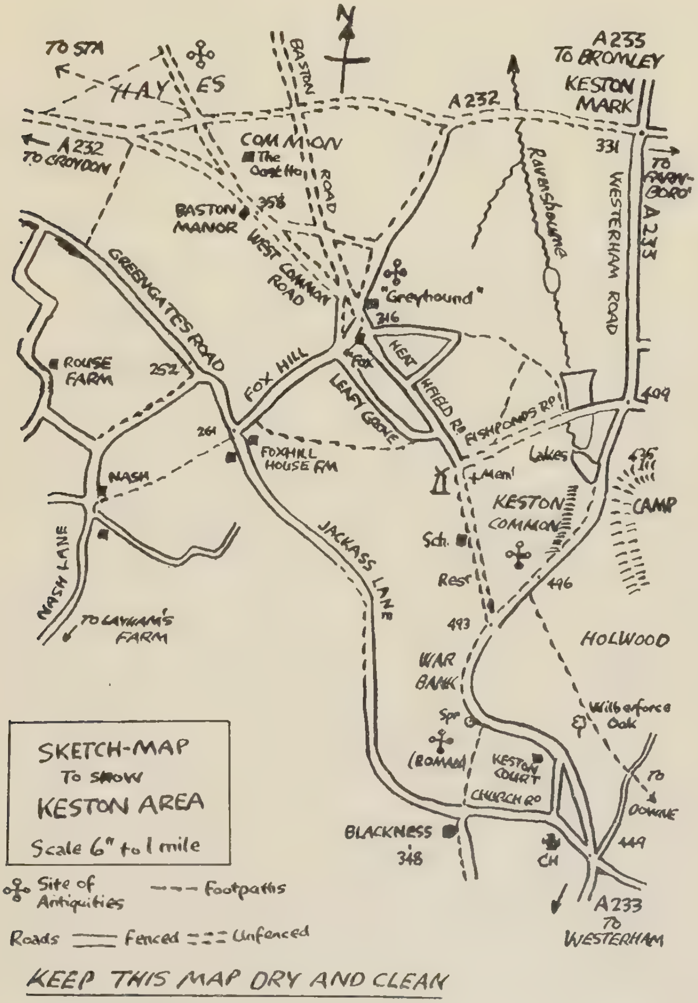
(i) There is no stereotype. Each journey, having special features, needs its own special pro-forma material (e.g. blank sections, field boundary maps).

(ii) A Programme of Individual Tasks is not given above, but is part of the follow-up of every journey.

(iii) Other most necessary elements in field-work organization include: Book-keeping of all money handled; reconnaissance party (sometimes); consideration of health, food, warmth, welfare; staffing problems—these may require two half-forms to make a composite journey in successive weeks. Early advance planning is essential.

Considerations such as these constitute a very large part of the preparation and execution of any field journey. It is also worthwhile to realize that only fluid and friendly control is appropriate if results are to be achieved.

A postscript written in March 1956—illustrating how secondary modern schools are changing: the G.C.E. course in this school is expanding to absorb 40 per cent of the intake; and now 24 boys entering the Fifth Form opt for Geography, an increase partly attributable to the interest created in the subject by the field work carried out during the previous four years.



5. *Duplicated map of the area, prepared on Banda machine, foolscap size.*

Vegetation Studies in South Africa

MONICA M. COLE

WITH THE PUBLICATION of J. P. H. Acocks' book on the *Veld Types of South Africa* (Memoir No. 28 of the Botanical Survey of the Union of South Africa, Government Printer, Pretoria, 1953) some reflections on the problems posed by vegetation studies in that country and the contribution that this new work makes towards their solution seem appropriate.

Earlier works on the vegetation of South Africa, notably those of R. S. Adamson (*Vegetation of South Africa*, British Empire Vegetation Committee, Royal Botanic Gardens, Kew, 1938) and I. B. Pole-Evans (*A Vegetation Map of South Africa*, Memoir No. 15 of the Botanical Survey of South Africa, Government Printer, Pretoria, 1936) were essentially descriptive. They gave excellent accounts of the composition of the vegetation and the salient structural features of the plants. In each case the distribution of the major vegetation formations was considered against the background of the physical environment. Although no direct correlations with relief, climate or soil type were made nevertheless the broad relationship between sclerophyllous bush and a winter rainfall régime was noted, the restriction of forest, savanna and desert scrub to the warmer areas and the prevalence of grassland where low winter temperatures obtain were made clear and the progressive change from forest to savanna and desert scrub linked with decreasing rainfall. But the authors did not explain the existence of sour grassland and apparently drought-resistant bushveld and thornveld in the warm, well-watered area of the eastern plateau slopes, and they failed to account satisfactorily for the presence of macchia in the southern Cape with its all-season rainfall and of desert scrub in the humid coastal area near Port Elizabeth. Moreover proteas (Proteaceae) which are characteristic of the Cape macchia (or *fynbos* as it is locally called) also occur scattered through the grassveld of the Drakensberg middleberg plateau and are found again on the quartzite ridges of the southern Transvaal and on the mountains of central Africa, i.e., in areas characterized by summer rainfall. This fact raised further doubts in the minds of those familiar with the country as to the connection between vegetation and climate and naturally posed the question of former floral distributions. R. S. Adamson discusses the former greater extent of the temperate forests of the southern Cape and J. F. V. Phillips, in "Fire. Its Influence on the Biotic Communities and Physical Factors in South and East Africa" (*South African Journal of Science*, vol. XXVII, 1930), describes the savanna as a

---

➤ Dr. Cole is Lecturer in Geography in the University College of North Staffordshire and was formerly a member of Staff in the Departments of Geography in the Universities of Cape Town and Witwatersrand.

type of vegetation due essentially to recurrent fires which serve to keep open the growth and prevent the natural succession to a climax in which trees assume a dominant role. In his work on the Knysna forests (*Forest Succession and Ecology in the Knysna Region*, Memoir No. 14 of the Botanical Survey of South Africa, 1928), J. F. V. Phillips discusses fully the role of plant succession and distinguishes between the climax vegetation and the seral communities.

Since the publication of Phillips' work, botanists working in various parts of South Africa have devoted increasing attention to the recognition of successional changes and seral stages in seeking to explain the distribution of vegetation types. But it is Acocks who, for the first time, gives due consideration to these dynamic aspects in a study of the vegetation of the whole country. He thinks of the vegetation of all parts of the country as subject to constant change. In the case of every vegetation formation he assumes a normal succession of plants through several seral stages towards the climax; and he emphasizes the importance of climatic change and man's activities, particularly those associated with grazing domestic animals and firing the veld, in hastening or retarding, deflecting or even reversing these normal successional changes. With the aid of this concept he has sought to elucidate some of the problems connected with the distribution of certain vegetation types and at the same time to explain the deterioration in the vegetation, followed in many cases by severe erosion, which has occurred in many parts of the country.

Over a period of many years Acocks has carried out extensive field investigations involving the collection of a wealth of data concerning the composition of the vegetation in all parts of the country and the analysis of innumerable relict communities. This information has enabled him to recognize and delimit the major vegetation formations and also minor vegetation types within them. The former are broadly similar to those of previous writers; the latter are quite new. He has given them the name "veld type" which he defines as "a unit of vegetation whose range of variation is small enough to permit the whole of it to have the same farming potentialities." This implies also that the whole of it has had a similar successional history and would undergo similar changes if disturbed by man's activities. By studying the composition, origin and inter-relationships of the veld types, Acocks has not only thrown considerable light on the origins of the major vegetation formations but has been able to reconstruct the picture of the vegetation prior to the advent of Bantu and European occupation and to discern and interpret the changes which have since taken place. On the basis of this work supplemented where possible by descriptions of the vegetation given in historical documents and the journals of early travellers, Acocks has prepared a series of maps showing the distribution of the major vegetation types at successive dates. The first map depicts the vegetation as it probably was in

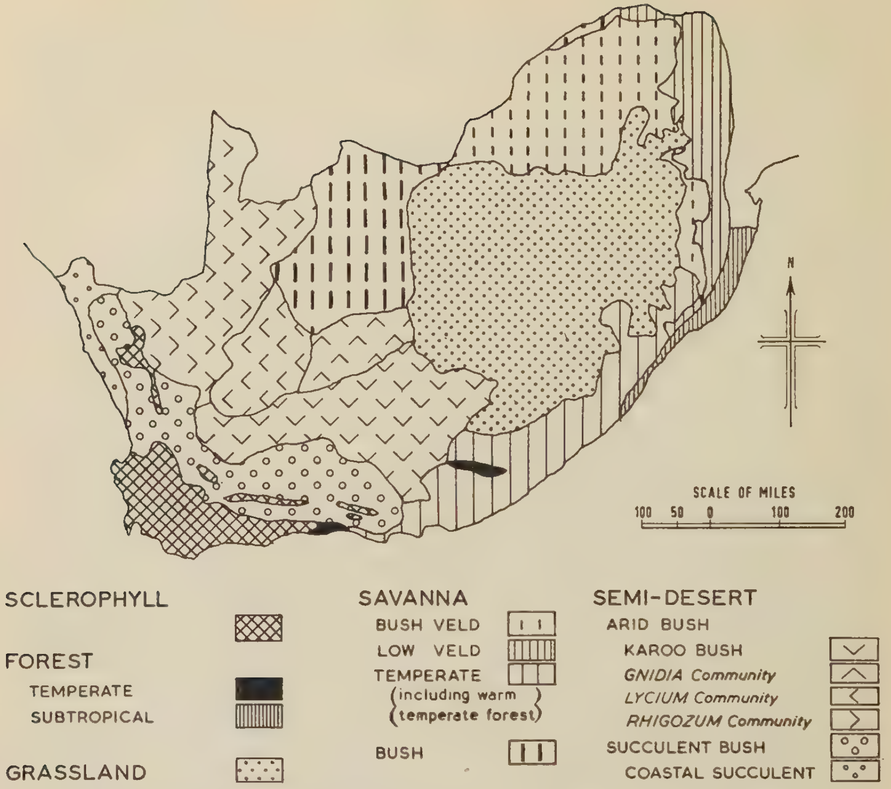


Fig. 1.—Vegetation of South Africa, after R. S. Adamson. The nomenclature in the legend is that adopted by Adamson.

A.D. 1400, i.e., before the advent of Bantu and European occupation; the second shows it as it was in 1950, and the third as it is likely to be in A.D. 2050 if the changes which are taking place to-day continue.

Acocks considers forest and scrub forest to have been much more extensive, in the recent past covering the greater part of the area between the Great Escarpment and the sea in the south and east, whereas to-day *fynbos* clothes most of the well-watered slopes of the Cape ranges, and grassveld, thornveld and bushveld alternate throughout the marginal belt of the Eastern Cape and Natal. He suggests that sweet grassveld was formerly more widespread and in particular extended westwards into the area now occupied by Karoo types of vegetation (desert scrub); the latter were formerly more restricted in their distribution.

In attempting to explain these changes Acocks gives due consideration to the origin and distribution of the floras contributing to the present vegetation formations. Like previous writers he recognizes two main floras—the Cape flora, forming the sclerophyllous scrub (*fynbos*) and forest of the winter rainfall area, and the Tropical flora embracing the tropical forest, savanna and grassveld of the summer

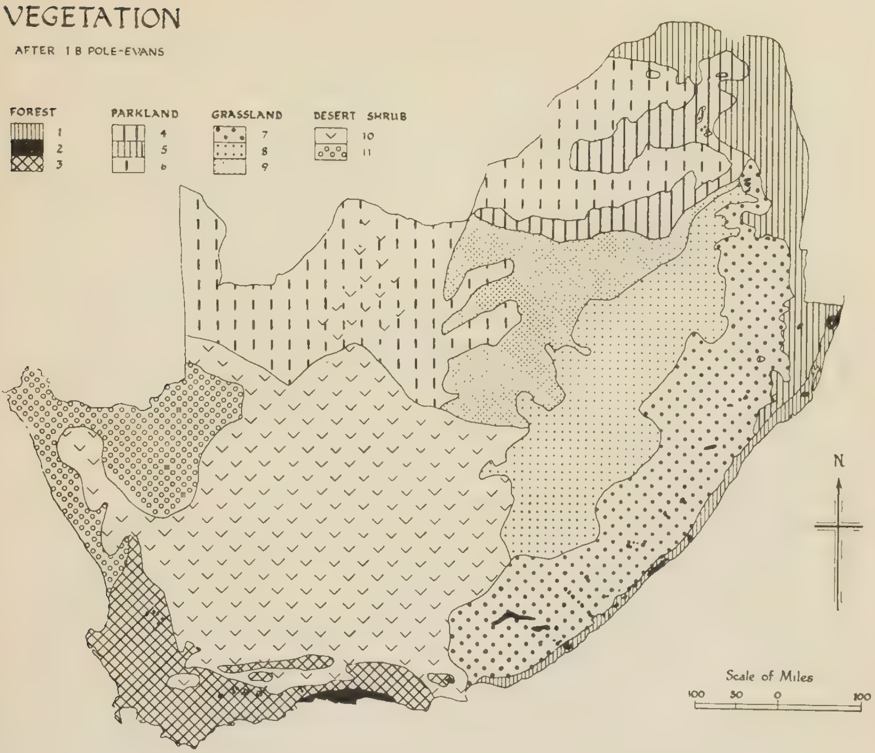


Fig. 2.—Vegetation of South Africa, after I. B. Pole-Evans. Key: Forest: 1. Evergreen and deciduous bush and sub-tropical forest. 2. Temperate evergreen forest. 3. Evergreen sclerophyllous bush. Parkland: 4. Evergreen and deciduous tree and bush. 5. Sub-tropical evergreen and deciduous tree and thorn forest. 6. Thorn country. Grassland: 7. Tall grass. 8. Short grass. 9. Mixed grass. Desert Shrub: 10. Desert Shrub. 11. Desert succulent and desert grass.

rainfall area. In each formation some species belonging to the non-characteristic flora are also present, but they do not contribute to the distinctive character of the vegetation. By contrast the Karoo vegetation is composed of those species of both floras which are able to withstand extreme conditions and therefore pioneer new areas. Acocks goes so far as to suggest the existence of a Karoo flora, but the evidence indicates that the Karoo vegetation is the product of the struggle between the pioneer species of both the Cape and the Tropical floras, each striving for establishment in an arid environment.

Acocks devotes some attention to the inter-relationships of the two major floras. Arguing from the present distribution of plants, he suggests that the Cape flora is the older and was once widespread over the southern subcontinent; in particular *fynbos* most probably covered those areas characterized by tropical grassland and savanna to-day. Later the plants of this flora were gradually ousted by the grasses and trees of tropical origin spreading southwards along the better-watered eastern coastal region and thence inland. In particular the sward-forming tropical grasses replaced the *fynbos* which was pushed back into the winter rainfall area, where the conditions were less favourable for grasses. The process was a very gradual one extending over hundreds of thousands of years and one subject to oscillation in response to ancient changes of climate. The result was the development of vegetation formations which represented the climaxes under the climatic and edaphic conditions prevailing in the different regions and provided a stable cover to the surface so long as these conditions remained undisturbed.

Since man appeared on the scene he has disturbed the balance and brought about dramatic changes in the vegetative cover. By burning and over-grazing the veld he has thrown back the succession, caused the recession of the Tropical flora and permitted the eastward spread of *fynbos* and Karoo scrub. Thus in Natal and the eastern Cape, forest and scrub forest have given way to sour grassveld on the wetter plateau slopes, and to bushveld and thornveld in the drier valleys. In the southern Cape, forest and mixed grassveld have been replaced by *fynbos* and in the south-eastern Cape and on the highveld Karoo scrub has advanced into areas formerly occupied by sweet grassveld. In the Karoo succulent forms have gained at the expense of shrubs and where the destruction of the vegetative cover has been followed by erosion, desert conditions have resulted.

From these studies it becomes clear that the *fynbos* of the southern Cape and the thornveld and sour grassveld of the eastern marginal belt are not climax vegetation types but successional stages produced by man's misuse of the land. The distribution of the Proteaceae is explained by the former greater range of the Cape flora.

It is important to stress that the veld type forms the basis of Acocks' work. Altogether he recognizes seventy veld types plus seventy-five variations. Those which have been the object of detailed study are fully described and lists of the plants making up the communities with data regarding the frequency of their occurrence are included. The quantitative basis thus given to the studies makes possible the clear recognition of any one type of vegetation, or vegetation formation, the definition of its limits and the extent of the transition zone. The composition of each formation is accurately depicted, the floral origin of the plants can be discerned and successional changes appreciated. Thus the vegetation formations recognized by Acocks are more accurately defined than those of earlier writers. It is therefore not surprising that while the vegetation maps of Pole-Evans, Adamson and Acocks are broadly similar, they differ in detail, particularly with regard to the grassland and savanna types. Thus, although Adamson recognized differences in the character of the grasslands, he regarded them as variations within the grassland formation which he mapped as a unit (Fig. 1). Pole-Evans made a distinction between short grassveld, mixed grassveld and tall grassveld (Fig. 2). These correspond

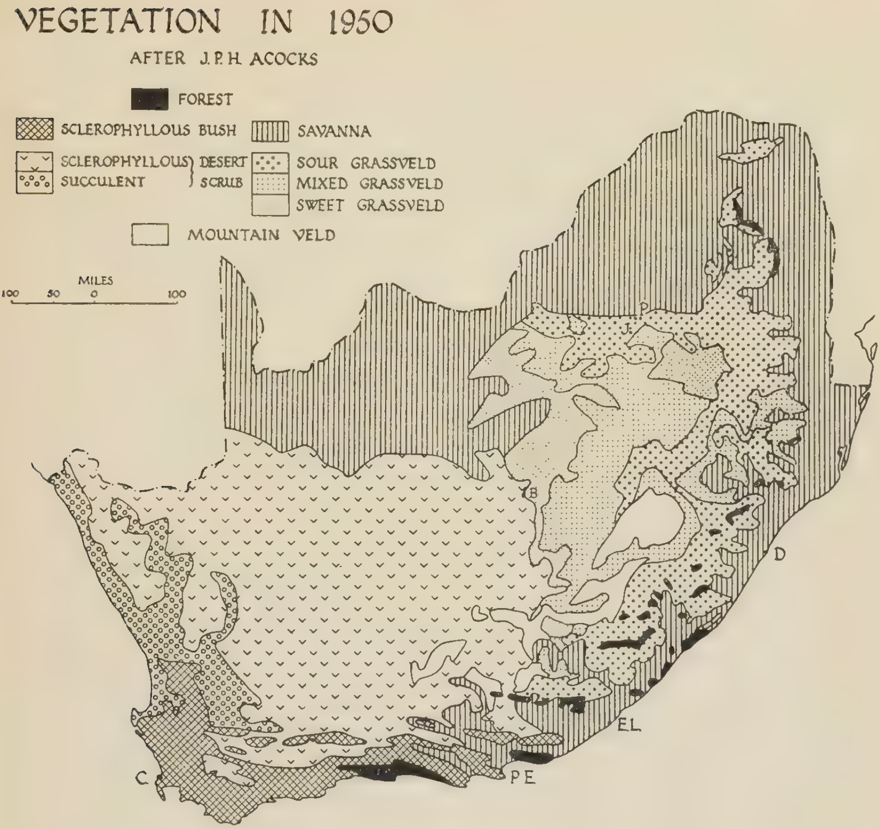


Fig. 3.—Vegetation of South Africa in 1950, after J. P. H. Acocks. Note: (1) The nomenclature adopted by the author differs from that used by Acocks. The latter uses the terms Bushveld, Karoo, Succulent Karoo and Scrubby Mixed Grassveld instead of Savanna, Sclerophyllous Desert Scrub, Succulent Desert Scrub and Mountain Veld respectively; (2) because of the small extent of natural forest remaining today no distinction is made on the map between sub-tropical and warm-temperate types. Sub-tropical forest, however, is limited to small patches along the Natal Coast. C—Cape Town; P.E.—Port Elizabeth; E.L.—East London; D—Durban.

in a general way to the sweet grassveld, mixed grassveld and sour grassveld of Acocks, who further recognizes the mountain grassveld of Basutoland and the Eastern Cape (Fig. 3). On the other hand whereas Adamson and Pole-Evans distinguished several types of savanna, Acocks recognizes these distinctions only in his veld-types map and depicts the savanna formation as a unit on his vegetation map. These essential differences arise very largely from differences of concept as between the descriptive and dynamic approaches to the study of the vegetation.

The changes which Acocks has elaborated are still continuing to-day. Already patches of Karoo vegetation occur as far east as the Natal Drakensberg and some Karoo species have reached 31° E, i.e., approximately the longitude of Durban. The rapid spread of Karoo species, which has been the most dramatic feature of recent vegetation changes, is continuing at an alarming rate and Acocks depicts a gloomy picture of the vegetation of the whole country by A.D. 2050 unless measures are taken to arrest the present trends. This picture is given in his third map which shows a considerable contraction of the sweet grassveld and mixed grassveld of the highveld plateau at the expense of the advancing Karoo, with desert occupying the greater part of the area at present characterized by Karoo scrub and extending into the Orange Free State and south-eastern Cape. However, Acocks provides a fourth map which shows the state to which the vegetation could be restored under scientific management, this map being based on a full appreciation of the physical environment, the present state of the major formations and the veld types, the distribution of the various species and the successional stages which must be passed through before any stable and satisfactory cover can be achieved. Naturally the map differs in many respects from that showing the vegetation before the advent of Bantu and European occupation. In many areas the changes in the vegetation wrought by man's activities have been so far-reaching that many centuries would be required for full recovery. The indigenous trees are slow-growing species so that the regeneration of the forests would be a very slow process; in any case much of the land is required for agriculture or grazing, and where the conditions are most suitable for afforestation, the establishment of plantations of rapidly growing exotic species is preferable to the regeneration of the natural forest. The map is of particular interest for those areas in which stock rearing is the main pursuit, for it indicates the extent to which the grazing can be improved simply by encouraging the natural processes of plant succession. This section of Acocks' work provides an excellent example of the value of biogeographical studies in the economic utilization of a region.

Acocks' book has certain shortcomings. It lacks balance; for example twenty pages are devoted to the Coastal Tropical Forest Types while the Sclerophyllous Bush Types receive only three; the Eastern Coastal Forests are given six pages, the Knysna Forests are dismissed in ten lines. Here it is necessary to bear in mind that, in the first place, the report is of an interim nature and, as yet, not all veld types have been studied in detail and that, secondly, the author has chosen to concentrate on the publication of new research work of his own and to make only passing reference to vegetation types already adequately described by previous writers. The book does not replace the work of earlier writers. Rather it provides an additional contribution to the study of the vegetation of South Africa.

Some geographers without a training in botany may find the book difficult to read. In particular they may feel bogged down by the multitude of botanical names given in the descriptions of the individual veld types, but it is fair to state that the author has presented his material in such a way that it is relatively easy to obtain a broad picture of the character of the vegetation without worrying about individual species of plants.

The publication is accompanied by a map in two sheets on a scale of 1 : 1,500,000. On it the seventy veld types are shown in combinations of colours so chosen that the main vegetation types stand out while the details within each are clearly distinguishable. In the preparation of this map the author has succeeded in a difficult task and at the same time has produced a very beautiful map.

This work should prove to be of great value to agriculturalists in southern Africa, and it should bring home to everyone, not least to geographers, the need for considering the dynamic aspects of vegetation and the caution necessary in relating existing vegetation—which may not be the climax—to climate, soil and relief conditions.

The following grouping of veld types and vegetation formations is given as a guide when reading Acocks' work.

Veld Types	*Vegetation Formations*
COASTAL TROPICAL FOREST TYPES	
1. Coastal Forest and Thornveld	Forest
2. Alexandria Forest	
4. Knysna Forest	
3. Pondoland Coastal Plateau Sourveld	Sour Grassveld
5. Ngongoni Veld	Savanna
6. Zululand Thornveld	
7. Eastern Province Thornveld	
INLAND TROPICAL FOREST TYPES	
8. North-eastern Mountain Sourveld	Sour Grassveld
9. Lowveld Sour Bushveld	
TROPICAL BUSH AND SAVANNA TYPES	
10. Lowveld	Savanna
11. Arid Lowveld	
12. Springbok Flats Turf Thornveld	
13. Other Turf Thornveld	
14. Arid Sweet Bushveld	
15. Mopani Veld	
16. Kalahari Thornveld and Shrub Bushveld	
17. Kalahari Thornveld invaded by Karoo	Sclerophyllous Desert Scrub
18. Mixed Bushveld	Savanna
19. Sourish Mixed Bushveld	
20. Sour Bush	
FALSE BUSHVELD TYPES	
21. False Thornveld of Eastern Province	
22. Invasion of Grassland by *Acacia Karoo*	
KAROO AND KARROID BUSHVELD TYPES	
23. Valley Bushveld	
24. Noorsveld	
25. Succulent Mountain Scrub	Sclerophyllous Desert Scrub
26. Karroid Broken Veld	
27. Central Upper Karoo	
28. Western Mountain Karoo	
29. Arid Karoo and Desert False Grassveld	
30. Central Lower Karoo	
32. Orange River Broken Veld	
33. Namaqualand Broken Veld	

Veld Types	*Vegetation Formations*
31. Succulent Karoo	Succulent Desert Scrub
34. Strandveld of West Coast	
False Karoo Types	
39. False Succulent Karoo	
35. False Arid Karoo	Sclerophyllous Desert Scrub
36. False Arid Karoo	
37. False Karroid Broken Veld	
38. False Central Lower Karoo	
40. False Orange River Broken Veld	
41. Pan-turf invaded by Karoo	
42. *Danthonia* Mountain Veld replaced by Karoo	
43. Mountain Renosterbosveld	
Temperate and Transitional Forest and Scrub Types	
44. Highland Sourveld and Dohne Sourveld	Sour Grassland
45. Ngongoni Veld of Natal Mist-belt	
46. Coastal Renosterbosveld	Sclerophyllous Bush
47. Coastal Macchia	
Pure Grassveld Types	
48. *Cymbopogon-Themeda* Veld (Sandy)	Mixed Grassveld
49. Transitional *Cymbopogon-Themeda* Veld (mainly on heavy soil)	
53. *Themeda* Veld to *Cymbopogon-Themeda* Veld Transition (patchy)	
55. *Themeda* Veld to Bankenveld Transition	
50. Dry *Cymbopogon-Themeda* Veld	Sweet Grassveld
51. Pan-turf Veld of Western Free State	
52. *Themeda* Veld (Turf Highveld)	
54. *Themeda* Veld to Highveld Sourveld Transition	Sour Grassveld
56. Highveld Sourveld to *Cymbopogon-Themeda* Veld Transition	
57. North-eastern Sandy Highveld	
58. *Themeda-Festuca* Alpine Veld	Mountain Veld
59. Stormberg Plateau Sweet Veld	
60. Karroid *Danthonia* Mountain Veld	
False Grassveld Types	
61. Bankenveld	Sour Grassveld
62. Bankenveld to Sour Sandveld Transition	
63. Piet Retief Sourveld	
64. Northern Tall Grassveld (Transition between Piet Relief Sourveld and Southern Tall Grassveld)	
65. Southern Tall Grassveld	
66. Natal Sour Sandveld	
67. Pietersburg Plateau Grassveld	
68. Eastern Province Grassveld	
Sclerophyllous Bush Types	
69. Macchia (Fynbos)	Sclerophyllous Bush
False Sclerophyllous Bush Types	
70. False Macchia	

(Extracts and maps from Botanical Memoirs of the Union of South Africa reproduced under Government Printer's Copyright Authority No. 2298 of 19th March 1956.)

This Changing World

EDITED BY L. S. SUGGATE

THE LOUGH ERNE DRAINAGE SCHEME

The fluctuations in level of Upper and Lower Loughs Erne and the obstructions to drainage in the rivers flowing into them create serious problems for the agricultural community. For the past thirty years the Government of Northern Ireland has been faced with the need for a comprehensive scheme to reduce the extensive flooding. A flood relief scheme was carried out at high cost in the 1880's but was based upon limited hydraulic data regarding rainfall, runoff and channel capacities, and was planned to meet drainage and power interests which to some extent conflicted with one another. New proposals which seek to restrict the flooding to the winter months when damage to crops will be minimized are now being implemented, the Northern Ireland contribution to the cost of these works being £350,000. The work on the Erne channels has been facilitated by co-operation with the Eire Government, which will benefit through improved control of the water supply to its power stations at Ballyshannon and Cliff, the Eire Electricity Board therefore sharing the total cost.

About 90 per cent of the catchment area of the two loughs (amounting to approximately 1,560 square miles) lies below 600 feet O.D. and consists mainly of moderate to steeply sloping clay land. The impervious nature of this boulder clay, which effectively blankets the Carboniferous Limestone, and the relatively high annual mean rainfall (41 inches at Enniskillen) provide conditions for a high percentage runoff of the rainfall in flood time. A study of the level gauges for the upper lough for some 37 years shows that whatever the level of the lough when a rain storm begins, it will quickly fill and the resultant amount of flooding is directly related to channel capacity between the two loughs. The constricted form of this inter-lough channel, or series of channels, is the prime cause of the flooding around the shores of the upper lough.

The appended graph (Fig. 1) indicates for the years 1929–53 the number of days of flooding for the upper lough, defined as when the water level rises above 154 feet O.D., which is 1 foot above the statutory level of 153 feet O.D.

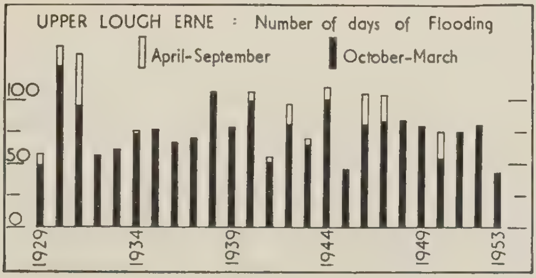


Fig. 1.

Flooding round the lower lough has never been a serious problem. In view of the high cost of any attempt to relieve flooding for the whole year it has been decided to concentrate solely on a summer relief project for Upper Lough Erne. The deepening and widening of the inter-lough channels is being carried out by the Northern Ireland Authorities, and the very extensive excavation works on the channel below Lower Lough Erne, the removal of old sluices at Belleek, and construction of the new Portora Barrage by the Eire Electricity Board. Control of the lower lake level will be operated from the new generating station at Cliff. Thus the highly important lower lake level will be regulated between 147 and 152 feet O.D. (the maximum level will be 8 inches below the statutory level of 152·66 feet O.D.) to the great advantage of the summer relief scheme, preventing serious fluctuations which would be transmitted to the upper lake so as to make the lough shores unapproachable and to affect adversely the town of Enniskillen. The extensive area of low-lying land about the lakes round and south of Belturbet will benefit to only a slight degree from this scheme.

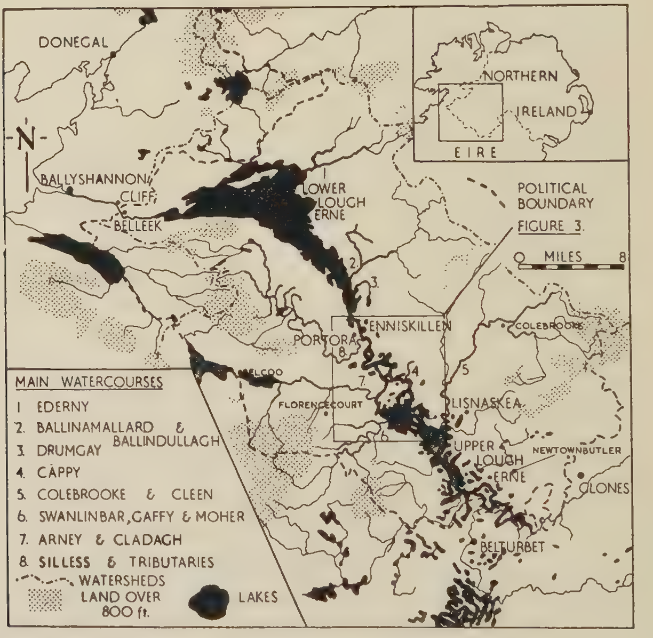


Fig. 2.—The main drainage area of Upper and Lower Loughs Erne. Note that the location of the area shown in Fig. 3 is indicated.

In addition to the major scheme on the Erne channels, arterial drainage on sections of those rivers feeding into the loughs and designated "main watercourses" (shown in thickened lines and numbered 1–8 in Fig. 2) has been completed (on the Colebrooke and Cleen) or is in course of being carried out by the Northern Ireland Ministry of Agriculture under their arterial drainage programme. This programme covers the whole of the Province and is financed by a general drainage rate on the whole country and an equal contribution from the Treasury.

With the encouragement of the Ministry of Agriculture, Joint Land Improvement Schemes are being initiated, part of the cost being borne by the riparian owners. The increased flow of water by way of the rivers and loughs and their improved channels, together with the improvement of field drains, should reduce not only the area immediately around the loughs which is regularly flooded, but also waterlogging of the surrounding land. It is officially estimated that 11,000 acres fall into the first category and a further 18,000 acres into the second.

The marginal state of the farming in this district, reflected in the poverty which is general in the rural community, has caused concern in Northern Ireland for many years. It has been regarded as the worst of many problem areas, and special subsidies, limited to Fermanagh and West Tyrone, have been payable on construction and improvement of farm buildings, purchase of seeds and fertilizers and eradication of rushes. In spite of the addition of these measures to the grants, subsidies and guaranteed prices, which, in Northern Ireland, are no less favourable than in Great Britain, the majority of the holdings remain essentially marginal. Without extensive amalgamation, this position is likely to endure owing to the uneconomically small size of unit (in 1944, 56 per cent of the farms were under 30 acres), but most holdings could be upgraded and productivity increased. Improved drainage is among the first essentials, and it is possible that this scheme may lead to the breaking of the vicious circle of low productivity, low turnover and low

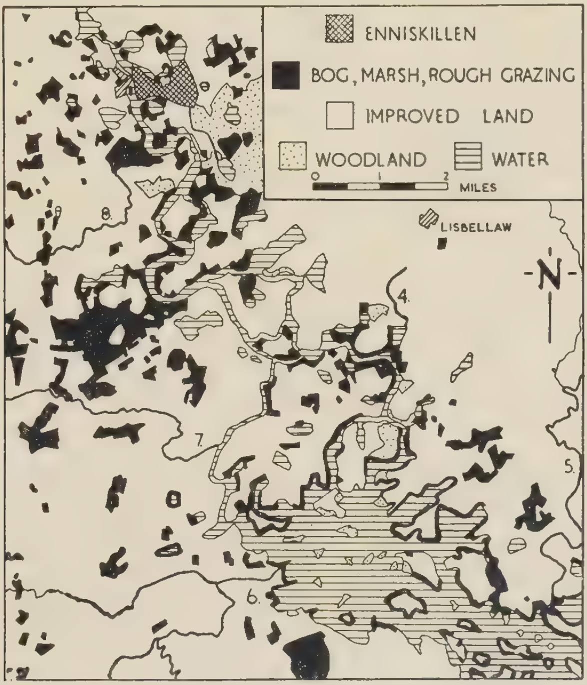


Fig. 3.—Land use around the north of Upper Lough Erne. For explanation of numerals see the legend of Fig. 2.

level of capital investment. The land which will benefit most by the scheme is of first importance in this respect because it consists for the most part of "bottom" lands near the lakes and the floodplain strips along large meandering rivers. At present most of the land immediately surrounding the lakes and much of that further inland is marshy and waterlogged and so low in productivity that it was classed as "bog" by the Land Utilization Survey (Fig. 3) though different in origin and ecology from peat bog or heath, which occupies higher land. Land classed as permanent pasture or arable land ("improved land" in Fig. 3) is also adversely affected by the high water table and heavily infested by rushes. It should be possible to produce high-class meadow land if the soil is given a chance to develop a good profile by the permanent lowering of the water table. The lake margin and floodplain silts should in addition provide fertile soil easier to work than the heavy boulder clays. Incidental work on bridges and roads will also provide improvements in the communications, especially for Inishmore in Upper Lough Erne. It is hoped that the scheme will be completed by 1958 or 1959.

(See *The Drainage of Lough Erne*, Report by the Drainage Advisory Committee. H.M.S.O. 1932. The co-operation of the Engineers of the Works Division of the Government of Northern Ireland in making data available is gratefully acknowledged.)

Queen's University, Belfast. N. STEPHENS and L. J. SYMONS.

POPULATION CHANGES IN WALES 1931 TO 1951

The publication of the county reports on the 1951 Census of Population permits a survey of detail not available in the Preliminary Report. The county reports enable a distinction to be made between the increase or decrease due to excess of births over deaths or vice versa and that which is due to other factors. These other factors are classed in the Census as "balance". This balance can be interpreted as consisting mainly of migration and no serious distortion will result from so regarding it. Each local government area can thus be placed in one of the six categories shown on the accompanying figure. Migration loss has been written as "Migration —" and gain as "Migration +". Gain by births over deaths has been written as "Natural Increase+" and loss by excess of deaths over births as "Natural Increase —". This apparent contradiction has been used in order to maintain uniformity of terminology.

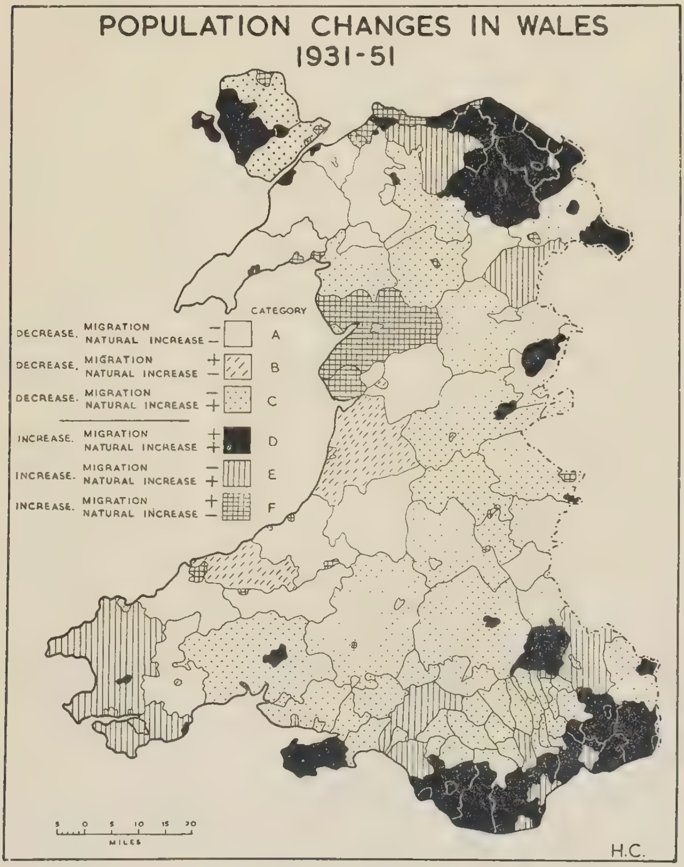
These categories can be analysed in turn, bearing in mind the major factors of 1. rural depopulation; 2. general urban increase; 3. the decay of the South Wales Coalfield in the earlier part of the period.

Category A. These are the areas most deeply affected by depopulating influences. There has been loss due not only to the outflow of population but to the great decline in the proportion of young people. This has produced an ageing population with a low general birth rate and a high relative death rate. The area covered includes the North Wales mountain core and extends southward through mid-Wales to the highland backbone of the southwest peninsula, the Preseli. For example, in Machynlleth Rural District:

Percentage increase/decrease, births/deaths:	— 1·5
Percentage increase/decrease, balance, i.e., migration:	— 9·0
Total percentage change:	—10·5

Category B. This has a very limited distribution and includes only Teifiside and the Aberystwyth hinterland. The inward migration is certainly accounted for in the latter case by the residential movement from the town into the surrounding rural areas; this is particularly marked as a wide range of administrative functions has been located in the town. It is significant that the parishes adjacent to the borough are those showing increases in total. This feature together with the ageing population of an interior long subject to depopulation would account for the natural decline. For example, in Aberystwyth Rural District:

Percentage increase/decrease, births/deaths:	— 7·0
Percentage increase/decrease, migration:	+ 2·6
Total percentage change:	— 4·4


POPULATION CHANGES IN WALES
1931-51
CATEGORY
DECREASE. MIGRATION — NATURAL INCREASE — A
DECREASE. MIGRATION + NATURAL INCREASE — B
DECREASE. MIGRATION — NATURAL INCREASE + C
INCREASE. MIGRATION + NATURAL INCREASE + D
INCREASE. MIGRATION — NATURAL INCREASE + E
INCREASE. MIGRATION + NATURAL INCREASE — F
5 0 5 10 15 20
MILES
H.C.

Category C. These areas are closely associated with category A above. They show an increase by excess of births over deaths but this is usually very slight and completely fails to make up for the heavy migrational loss. The remainder of the Welsh heartland is included within this category. All the areas of marginal farming fall into this or the previous groups. For example, in Penllyn Rural District:

Percentage increase/decrease, births/deaths:	+ 0·1
Percentage increase/decrease, migration:	−21·5
Total percentage change:	−21·4

Also appropriately included within this category is the bulk of the South Wales Coalfield. The large influx of youthful population until the first World War has meant that generally the birth rate has remained high and the average age fairly low. Births have thus exceeded deaths but the catastrophic loss of population during the inter-war economic depression heavily outweighs any natural increase. For example, in Rhondda Urban District (now elevated to a Municipal Borough):

Percentage increase/decrease, births/deaths:	+ 5·2
Percentage increase/decrease, migration:	−26·4
Total percentage change:	−21·2

Category D. From a population point of view these are the most expanding areas in Wales. There have been marked gains both by immigration and by excess of births over deaths. These areas are: 1. The country towns: these have gained not only through the general move from the countryside to town but by virtue of their functions as local administrative and service centres and through the development of a mechanized agriculture and of rural industries. 2. Areas of urban expansion: overflow from the bigger towns has resulted in marked increases particularly in those parts adjacent to Swansea, Cardiff and Newport. 3. Northeast Wales: this is an area of marked industrial expansion and one of the most rapidly developing parts of Wales; virtually a new conurbation is being created along middle Deeside. For example:

	Haverfordwest M.B.	Gower R.D.	Holywell U.D.
Percentage increase/decrease, births/deaths:	+10·0	+18·8	+17·6
Percentage increase/decrease, migration:	+ 8·5	+61·6	+32·7
Total percentage change:	+18·5	+80·4	+50·3

Category E. In these parts of the country a slight emigration has been offset by the natural increase. These seem to be better agricultural areas such as Pembrokeshire, the Vale of Clwyd and parts of the Usk valley, which have not been affected by urban expansion. Such areas have not been markedly affected by rural depopulation and consequently retain a greater degree of population stability. Also in this category are the more stable industrial areas, such as Port Talbot which did not suffer so markedly during the inter-war period. Neither of these types of area has sustained a large-scale loss of young people and natural increase has made up for small migratory losses. For example, in Aled Rural District:

Percentage increase/decrease, births/deaths:	+5·2
Percentage increase/decrease, migration:	−2·5
Total percentage change:	+2·7

Category F. Increases dominantly due to migration with no gain by births over deaths characterize these areas. Two types can be identified: 1. The remaining towns, more especially the smaller towns. 2. Those places where extensive military development has taken place introducing a new element into the countryside and one which is often very large in relation to the small indigenous population. For example, in Towyn Urban District:

Percentage increase/decrease, births/deaths:	— 5·7
Percentage increase/decrease, migration:	+23·8
Total percentage change:	+18·1

The division of the country into these categories provides a very interesting commentary both on the economic geography and the regional geography of Wales.

University College of Wales, Aberystwyth. H. CARTER.

PROGRESS OF THE EUROPEAN COAL AND STEEL COMMUNITY

The European Coal and Steel Community has now been in operation for three years, and although its full effects have not yet been felt (certain revisions of freight charges, for example, do not become effective until 1957), it is at least possible with the aid of the Community's Third General Report (1955), to see in what way it is confronting its problems—problems upon which, it was freely predicted in 1952, the scheme would founder.

Trends in Production, Trade and Prices. The primary justification of an agreement such as the E.C.S.C. treaty is naturally to be sought in freer interchange of goods and lower prices to all consumers within the Community. In the event, production of both coal and steel has increased slightly since 1952. Trade in coal within the Community has increased by about 25 per cent over the period, and trade in steel has virtually doubled; in both cases the amount now involved is 10–12 per cent of the Community's production. The price of steel has risen by 5 per cent since 1952, compared with 6 per cent in Great Britain and 10 per cent in the U.S.A.

Since these general results are the product of so many forces, it will be well to mention one cost reduction directly attributable to the Community's work. This is the lowering of freight charges on international shipments (the term "shipment" covers transport by rail or water) of coal, coke and ore. In the past, these charges have acted as concealed tariffs, (1) because of the habit of charging frontier-crossing fees (the freight being in theory unloaded and reloaded at the border), and (2) because each country *en route* has charged a mileage rate for the freight which assumed that the shipment started at its own border, so the benefit of tapering rates over longer distances was lost. By 1957, the Community will have secured the abolition of frontier charges and the establishment of single, through rates between all points within its area. On a typical shipment of coke from the Ruhr or Dutch Limburg to Lorraine, these changes will result in a 30 per cent reduction in freight cost; on a shipment of iron ore from Luxembourg to the Ruhr, the reduction will be 25 per cent.

The Location of Industry. The E.C.S.C. treaty called for the abolition of protective tariffs and thus the establishment of a common market. It was foreseen that two implications of such an arrangement would cause serious problems—(1) that competition on the new scale would force high-cost producers out of business and that *international* competition might place *all* a nation's producers at such a disadvantage (on account of different national wage levels, etc.) that its government would be forced to protect them again; (2) that rationalization would affect labour requirements and that regional unemployment would result. In either case, geographers looked forward with interest to seeing what changes in industrial distribution would occur. In the event, hardly any changes have taken place, and none is immediately foreseen. The basic reason for this is that the High Authority of the Community (which has of itself no powers to close plants) assumes that in the foreseeable future the Community will consume all the coal and steel it can produce, and more, and that therefore its first task is by any means to keep mines and furnaces in operation. Thus instead of the high-cost producers being eliminated, the High Authority is helping them either with loans to modernize and increase the efficiency of their plants or with funds to permit them to convert to other types of production for which their advantages may be greater. Only if the basic condition of the coal and steel market changes does it seem likely that shifts in location will occur.

Towards the Community's labour, the High Authority acts in essence as an international insurance agent. Where workers become redundant, the treaty provides that the High Authority "must help to protect the workers from the burden of re-adaptation and assure them productive employment." Thus, when some small mines in southern France were recently closed, the Authority agreed to help finance the resettlement of the miners in Lorraine. The fact that, of 3,000 miners involved, only 300 have accepted the offer (financially, a generous one) does not alter the circumstances—the mines were closed by Frenchmen, and the offer was made by an international agency. Again, when a French steelworks was closed for re-equipment and modernization, the High Authority combined with the French Government to ensure to the 1,500 workers their wages over the two-year period of re-adaptation, when they would otherwise have been unemployed. Thus while the Authority continues to press for free movement of labour between the member states, it seems likely that any movement that takes place will be the result of careful planning rather than haphazard economic pressures.

Administration of the Community. Since the E.C.S.C. was designed as a federal agency, to which the member states would have to surrender certain powers, widespread misgivings surrounded the launching of this first experiment in genuine European federation. In the event, its success has been considerable, on the one hand because of the Authority's tactful application of the treaty and on the other because the Authority is equipped with both funds and adequate sanctions. Co-operation by both the coal and steel producers (whose payment of a 0·45 per cent production tax forms the basis of the Authority's revenue while acting as their own "insurance premium") and by the member states has been good. The Authority's power to establish maximum and minimum prices has been accepted quietly by an industry with considerable past experience of price fixing and producers fined for infringements of the treaty conditions have paid.

Within this sector of the Western European economy, therefore, the federal experiment has caused little disturbance while achieving a real measure of success. This absence of disturbance may perhaps prove valuable in encouraging Western Europeans to treat the E.C.S.C. as a pilot scheme for the integration of other sectors of the continent's economy. Whether such integration is possible and desirable is the question which they now have to decide.

University of Cambridge. J. H. Paterson.

POPULATION AND ECONOMIC DEVELOPMENT IN SOUTHEAST ASIA

Prospects for economic development in southeast Asia are being deeply affected by demographic facts, more especially by a high and mounting rate of population growth and by a bottom-heavy age structure. The rate of population growth in southeast Asia is nowadays little disturbed by external migration; the region no longer receives large numbers of immigrants from India and China. Population growth in southeast Asia is now chiefly a function of a high rate of natural increase averaging between 15 and 20 per thousand, though in Brunei, Singapore Colony and the Federation of Malaya it rises to over 30 per thousand. Even if these rates remain as they are they will increase the total population by over half within 30 years. But with the further extension of medical knowledge and services these rates are likely to rise, especially in such countries as Burma where the death rate is still high (33·5 per thousand). In terms of capital these high rates of natural increase are expensive; southeast Asian countries are being forced to save up to 15 per cent of their national income merely to cope with the additional population without achieving any increase at all in the average standard of living. Indeed, one of the chief problems in southeast Asia today is how to ensure that the benefits of economic development are not swallowed up by a too rapid growth of population.

A bottom-heavy age structure is general throughout southeast Asia. It is true that some countries like Burma and Malaya, which have experienced heavy immigration in the recent past, have a less bottom-heavy age structure than those countries which have received few immigrants, immigrants from India and China having been disproportionately of the young adult age group. Yet even Burma has 37 per cent of its population under the age of 15, and on the average the percentage of the population of southeast Asia excluded, at least in theory, from the effective working population is 40 per cent. However, this theoretical burden of child dependency is in practice lightened by the low age at which children enter the effective working force. For this reason, indeed, a large family is frequently regarded as an economic asset. Yet there is no doubt that the high proportion of children in the total population does limit capital formation, already made difficult, as suggested above, by the high rate of population growth. The needs of the whole community have to be satisfied by a small working population so that little is left for the purposes of investment. Moreover, where infant mortality rates are high (200 per thousand in Burma), an unusually large part of the investment made in bearing and rearing children is wasted because so many of them never live long enough to enter the labour force.

Though the ratio of dependent to economically active persons is high, there is no widespread shortage of labour. On the contrary, underemployment is a characteristic feature of southeast Asia. In so far as the problem of labour supply *is* quantitative, it is not that there are too few economically active persons available, but that there are too many to be supported by the economic structure, weakened as it is already by the rapid rate of population growth and by the high ratio of child dependency.

The high rate of increase of population is the fundamental problem to be tackled. Time and a decreasing rate of population growth will bring about a more normal age structure. The prospects of reducing the rate of natural increase by birth control measures seem slight. They are for long unlikely to be effective in underdeveloped southeast Asia where educational and economic standards are still low, and cultural, particularly religious, prejudices are difficult to overcome. A more practicable approach is being adopted: to increase the rate of production over the rate of population growth. The emphasis here, however, is on industrialization (which if accompanied by any significant degree of urbanization may effect the desired decline in fertility) and the intensification of agricultural production. The extension of agricultural land, involving the redistribution of population for agricultural colonization, is at present contributing little towards the solution of the economic-demographic problem in southeast Asia. It is true that it does help to increase the total food production and is undoubtedly encouraging economic development in the receiving areas, but there is as yet no evidence that the redistribution of population for agricultural colonization in the region is anywhere appreciably lessening population pressure in those areas from which the colonists come. The numbers involved are never large enough over a short enough period. This is true even of Indonesia which has a vigorous policy for agricultural colonization. Only about 30,000 colonists moved during 1954 from Java to the more sparsely populated islands—chiefly Sumatra and South Borneo—whereas the population of Java increased by over half a million during that same year. It is planned, however, to move up to 500,000 a year out of Java by 1959, an objective which, if realized, could mean a significant contribution towards the relief of the most serious problem of population pressure in southeast Asia.

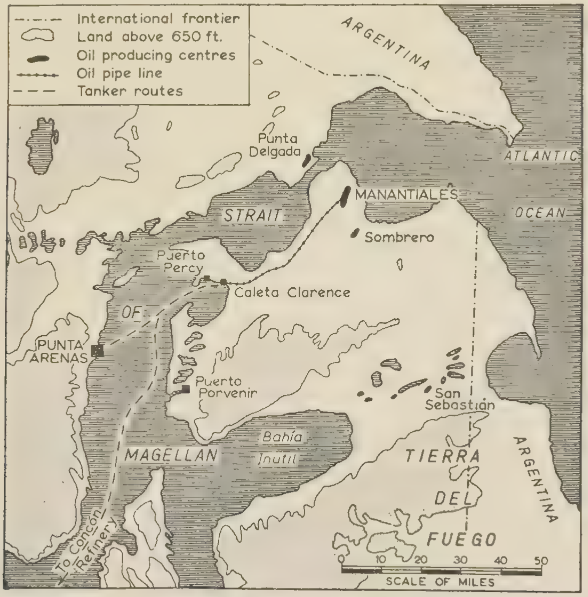
University of Malaya, Singapore. B. W. Hodder.

THE MAGALLANES OILFIELD

The discovery, late in 1945, of Chile's first major oilfield on the island of Tierra del Fuego, marked the culmination of a long search for oil and set in motion a series of developments which have broken Chile's previous absolute dependence on foreign sources of petroleum. Although most of the exploratory and drilling work in the oilfield has been supervised by United States' technicians, the initiative in the enterprise was taken by the Chilean Development Corporation set up by the Government in 1939 to develop sources of power and plan the country's industrialization.

The principal region of production is centred on Manantiales where the first successful well was drilled, but subsidiary producing areas elsewhere in the northern peninsula of Tierra del Fuego, and at Punta Delgada on the mainland, indicate a fairly extensive petroliferous region in Chile's territory east of the Andes. Production has steadily increased so that 1955's total was approximately 2½ million barrels, or more than five times that of 1950. A small refining plant on the oilfield produces all the petrol, paraffin and diesel oil needed for Chile's southernmost province, Magallanes. This obviates the necessity to import supplies for the vital transport needs of the sheep farms of the region and the domestic and industrial requirements of Punta Arenas, its distributing and collecting centre.

The great bulk of the petroleum, however, is sent by pipe line to a new port at Caleta Clarence on Gente Grande Bay, a development completed early in 1952. From that date until late in 1954 the crude oil was exported to Uruguay, as Chile did not possess a suitable refining plant. This has now been constructed at Concón, 15 miles north of Valparaíso, and full refining capacity of 20,000 barrels daily was reached in August 1955, one third coming by tanker from the Chilean field and the remainder from Venezuela. The refinery produces a wide variety of petroleum products and it is planned soon to link it by a pipe line to Santiago. The new iron and steel plant at Huachipato (also a creation of the Chilean Development Corporation) is now engaged on the manufacture of the hundred miles of pipe required for this development.



Although the opening up of the oilfield and refineries has cost Chile over £27 million, and two thirds of this in foreign exchange, it is confidently hoped that the ultimate saving will be many times this amount. In addition there are the benefits accruing from increased diversification of the country's economy without international and economic complications associated with foreign concessions and royalty payments.

A complementary development, to supply the far north of Chile's extended territory, is the construction of an oil pipe line from Bolivia to the port of Arica. The landlocked state of Bolivia, with a limited amount of motor transport and industry, has a surplus of petroleum which will be exchanged for Chilean steel, nitrate and fruit. In view of the descent of this pipe line from Oruro, over 12,000 feet above sea level, it has been proposed that the installation of a turbo-electric generator in Arica would enable sufficient power to be produced to supply the needs of this relatively small port. Should this materialize it would probably be the world's first example of petro-electric power ! (Another pipe line from Camiri to Yacuiba will take more surplus Bolivian crude petroleum to Argentina, and Brazil will also receive considerable quantities of refined products from the same source.)

The University of Birmingham. GILBERT J. BUTLAND.

The Geographical Association

SUMMER SCHOOLS 1956

A few places remain available in the Summer School to be held at Exeter, for field studies in South Devon, from July 28th to August 7th. The inclusive course fee is 18 guineas. Intending members of the course who have not already booked should apply immediately for reservations. Full particulars are available from headquarters office.

Applications for the Guernsey Summer School, July 28th to August 12th, which is fully booked, may now be accepted for a reserve list awaiting possible cancellations.

PUBLIC AND PREPARATORY SCHOOLS SECTION

The name of Professor Steers' successor as chairman of this section was incorrectly shown in the January issue of *Geography* (list of officers on inside back cover). The new chairman of the section is Professor R. Ogilvie Buchanan, London School of Economics.

REPRINT—*The Vale of York*

Two of the papers read at the Spring Conference at York in April 1955 and published in *Geography*, November 1955, have now been produced in the form of a special reprint. Entitled "Studies of the Vale of York", the reprint is available from headquarters at 2s. post free.

BRANCH NEWS

Attempts are being made to form a geographical society in Eastbourne. With the support of local members, such a society could become a new branch of the Association. Members who wish to participate in activities there should write to Miss R. Robson, Eastbourne High School, Eldon Road, Eastbourne.

Reviews of Books and Atlases

With very rare exceptions, books reviewed in this journal may be borrowed from the Library by full members or student library members of the Association.

The Settlement of the Celtic Saints in Wales. E. G. Bowen. 14×21·5 cm. x+175 pp. Cardiff: University of Wales Press. 1954. 10s. 6d.

The members of the Association far and wide know the author of this book as a stimulating teacher with an originality of outlook and an inspiring enthusiasm. For many years he has been thinking of the historical geography of the Celtic fringe and his little book on Wales (1941) has seen reprints and new editions and, one hopes, will long continue to influence teaching and research. The Celtic Saints were the teachers of Christianity in the region mainly west of Anglo-Saxondom, on either side of the Irish Sea and also in Scotland. This was a region less influenced by the Romans than were the English plain and the ways northward to the Wall, and pre-Roman patterns of maritime communication tended in the Celtic fringe to survive the Roman period. Land communications no doubt survived, too, but were more modified by Roman road-building. Professor Bowen on these bases describes the work of the Saints and shows us, for example, Dewi (David) spreading his influence northward as far as the dialect boundary formed by the deep, wooded valleys of Wyre and Ystwyth. The book abounds in shrewd inferences, some of which, in such a field of scanty evidence, may be tentative.

The brave attempt is made to study the siting of early churches and villages in relation to the travels of the saints, and we get visions of a historical geography of settlements that we hope may develop. The whole work is characteristic of its author's enthusiastic research and of his readiness to modify earlier views in the light of later evidence. An abundance of clear maps and diagrams adds to the effectiveness of this suggestive book. H. J. F.

West Highland Survey: An Essay in Human Ecology. F. Fraser Darling (editor). 15·5×24·5 cm. xvi+438 pp. Oxford: Oxford University Press. 1955. 30s.

This book is an account of the findings of the West Highland Survey, which was established under Dr. Darling's direction in 1944. It was financed by the Development Commission through the Department of Agriculture for Scotland, and continued with a small team of assistants until 1950.

The volume of fact and commentary which has now been published is probably the best book that has ever appeared on the problems of the West Highlands. It covers almost all aspects of the historical geography of land use. It analyses the ways in which man has devastated the land, as well as the current human depopulation, which paradoxically, now desperately needs reversing if the devastation is to be counteracted. The Highlands are still suffering from a type of land exploitation, particularly sheep grazing, which does not keep enough people on the land to carry out the known remedies for rehabilitation.

Remedies are not known for all the specific ills, however, and the author makes a number of suggestions for further research, some of which are now being carried out by various bodies. He stresses at the end of the book that it is not sufficient to read only the summary and conclusions, because these mask intricacies of many of the ecological relationships. But even those who cannot read the whole of this book will find all parts of it interesting in themselves, and correctives to the flood of romanticized descriptions of the Highland scene. F. H. W. G.

A Social Geography of Europe. J. M. Houston. 14×22 cm. 271 pp. London: Gerald Duckworth & Co. Ltd. 1953. 21s.

The author regards the study of rural and urban settlements and population as the kernel of social geography. In historical geography he discusses field systems, rural landscapes and settlement types in Europe, together with house types. In urban geography he deals with the growth and function of towns, their sites and morphology and types of European cities. Population is analysed in various interesting ways. In all this he has read widely and brought together ideas and facts in a new stimulating presentation. In Part I he has included a thoughtful study of the scope and nature of geography which is the best thing of its kind yet written by a British geographer. Amongst many arresting conclusions is this: "If causation rather than description receives undue emphasis the research worker soon leaves the orbit of geography". Thus the geomorphologist is in danger of becoming a geologist, the climatologist a physicist, and, presumably, the historical geographer a historian. The point is well made: we have been warned!

This is a most interesting and valuable work for University students, all teachers of geography and sixth formers. Every sentence makes a point of importance yet it is clearly written and well illustrated with 29 photos and 47 maps. Dr. Houston has made a significant contribution to our studies and outlook in geography and is to be warmly congratulated on this fresh and invigorating study. A. D.

Sverige Nu. H. W. Ahlmann, S. O. Garland, C. M. Mannerfelt and B. Beckman. 22×28 cm. 63 pp. Stockholm: A. C. Carlsons Bokforlags. 1949. n.p.

Sverige Nu is the work of a group of geographers applying imaginatively the range and variety of modern methods of geographical representation to Sweden today. They have succeeded in compiling a popular summary of the essentials of Swedish life without relaxing the high standard set in Swedish geographical publications. In the introduction, Hans Wilson Ahlmann writes that *Sverige Nu* is intended for use "not only as an atlas, but also as a text-book in Swedish geography, especially its economic geography." The three parts into which it falls illustrate this. The first sixteen pages cover the physical geography of Sweden—genetically as well as contemporarily. There follows a map of the country, scale 1 : 1 m., divided into eight parts. This division is undoubtedly practical, but a folded map would have been more appealing. The third part opens with demographic, agricultural and industrial studies, proceeds to a survey of hydro-electric power, of lines of communication and of traffic flow, and culminates in standard-of-living diagrams. This section, already considerably dated, measures the speed of development in modern Sweden. There are also plans, scale 1 : 40,000, of the principal cities. The Swedish language is employed throughout; but this is no obstacle as much of the material is self explanatory. *Sverige Nu* is an excellent means of looking at the country as its geographers would have young Swedes see it. W. R. M.

Land of the 500 Million: a Geography of China. G. B. Cressey. 18·5 ×25·5 cm. xv+387 pp. London: McGraw Hill Book Co. Inc. 1955. 56s. 6d.

This handsomely produced volume replaces both the author's *China's Geographic Foundations* and the China section in his *Asia's Lands and Peoples.* Like them it devotes equal space to the geographical aspects of China as a whole and to her geographical regions. The scheme for the latter remains that of *Asia's Lands and Peoples* but by the division of the Southwestern Uplands into the Yunnan Highlands and the Kweichow Hills the total of nineteen regions for all China becomes twenty. Textually as comprehensive and detailed as its predecessors, it is far superior in wealth and excellence of maps and illustrations which include several superb aerial photographs. Among forty-one maps the following are very noteworthy: Rural Population, Urban Population, Political Divisions (elucidating recent administrative changes and the 1955 pattern), Changing China (territorial fluctuations throughout history), Land Form Regions, Frost Free Periods, Climatic Regions, Flooded Areas, Irrigated Land, Navigable Waterways, Land Usability, Soil Types, Industry, Railways. Climatic records and graphs, and statistical tables are also prominent.

This work further merits emphasis as a notably up-to-date picture of China in rapid transformation. Treating population it discusses 1953 census results; major public works and outstanding industrial plant extensions undertaken since the establishment of the Communist régime in 1949 are reviewed and illustrated; production estimates for 1954 under the First Five-Year Plan (1953–57) and its final goals, as announced in mid-1955, are indicated and commented upon. But whilst recognizing the undoubted magnitude and profound economic, social and political significance of achievements to date and the gathering momentum of change, the author is guarded respecting Communist claims. For example, the 1953 Census announcements "may be designed to impress the world with Chinese strength, to support claims for a falling death rate, or to supply an excuse for food shortages" (p. 9). And considering natural resources, skill and capital likely to be available he regards their goals, for the foreseeable future at least, as unduly optimistic. One does not expect complete agreement concerning contemporary China or her prospects.

The table (p. 39) and map following unintentionally suggest that Korea passed to Japan in 1895. In the column heading of the climatic table (pp. 76 and 78) "precip/rainfall" should read "temp/precip"; and occasionally minor discrepancies occur between figures against places in this table and the corresponding figures given elsewhere below climatic graphs for the same places. On p. 335 "Makau" is a misprint for "Makan."

A very up-to-the-minute bibliography is provided. This authoritative text-book is indispensable for all serious students of China. A. V. W.

Japan's Natural Resources and their relation to Japan's Economic Future. E. A. Ackerman. 19×26 cm. xxv+655 pp. Chicago: Chicago University Press Ltd. London: Cambridge University Press. 1954. £9 7s. 6d.

From 1946 to 1949 the author, Professor of Geography at Chicago University, was Technical Adviser and Visiting Expert Consultant for the Natural Resources Section G.H.Q.-S.C.A.P., Japan. Data collected during his field studies, and by others between 1945 and 1951, amplified by a mass of literature (158 reports and 72 preliminary studies are listed) by the Section, and from the Resources Council, Economic Stabilization Board, and other Japanese Government agencies, form the basis of this volume. The bibliography also indicates several supplementary sources, and numerous individuals are thanked for information and specialist advice. The result is a massive, elaborately documented and annotated authoritative work which, quoting the author, "is thought to be the first undertaken for a detailed analysis of the resource position of any nation and the possibilities of integrated resource management for that nation."

The actual text constitutes less than half the book; statistical tables, illustrated graphs, diagrams, appendices, notes, and index make up the rest. Of the 138 tables, ending generally with 1950, many cover 20 years or more. The illustrations, excellently produced but not listed or numbered, total 284; excepting a few, too small to be significant, all are most informative. The 64 maps, comprising a very comprehensive economic collection, and the numerous graphs and diagrams, mainly indicating production and consumption trends are all well drawn and clear.

The text is in three parts. Part I, Character of Resources and Requirements, has 8 chapters. The first outlines Japan's physical background. In the light of this and of other relevant considerations, social and economic, the remaining chapters examine production and its relation to needs, dividing resources into groups as follows: foods, energy, fibres, non-mineral construction materials, mineral raw materials.

Japan's intensive exploitation to date notwithstanding, its resources could be made to go further. Part II, Possible Advances in the Efficiency of Resource Use and Associated Problems comprising 11 chapters, suggests ways and means of doing this. Part III, Japan and the Western World, is the shortest. The first of two chapters usefully summarizes many of the previous analyses and urges that any permanent solution of Japan's fundamental problem, i.e., how to become self-supporting, can be sought only in an intelligently planned co-ordinated policy for the western world of which she is now part, and one of its frontiers. The second notes that Japan also lies near some of the world's underdeveloped areas and how she shares some of their characteristics. Her position is then examined in relation to a development policy to promote peace, justice and recognition of the right of all mankind to the best fruits of its labours.

This book is very expensive but essential for those libraries upon which advanced students of economic geography, Japan, and International Relations depend for reference purposes. A. V. W.

Southern Africa: a Geographical Study. Vol. I, Physical Geography. Vol. II, Economic and Human Geography. J. H. Wellington. Vol. I, 23·5×16·5 cm., xxiii+528 pp. Vol. II, 23·5×16·5 cm., xii+283 pp. Cambridge: University Press. 1955. Vol. I, 70s. Vol. II, 35s.

The lack of comprehensive text-books on African geography is due partly to the late development of the subject in that continent, to the lack of detailed field studies, and also to the long years necessary for sifting the wide range of relevant scientific and technical, yet non-geographical literature. Professor Wellington has given an academic lifetime of such fieldwork and reading, compilation and synthesis, to the preparation of these two volumes. Though some will dispute his definition of

"Southern Africa," he has strong support for his thesis, based mainly on hydrographic considerations. Others will disagree with his mode of presentation, which differs from the regional approach, in that he does not integrate under the conventional headings all that is known about specific regions. His is rather the genetic and *holistic* approach, particularly when he refers to the physiography of Southern Africa; a field he has made his own. Here and in his chapters on the hydrography of the major river systems, his prose has a lucidity which comes from a profound knowledge of the country he describes. Yet throughout volume I he is constantly reminding us by his references to history, land use, and water supplies, that human activities are the prime interest of the geographer. Chapter 15 of this volume is incidentally the first comprehensive analysis in English of past physiographic relationships between Madagascar and Africa.

Many will question the author's inclusion in volume II of subjects like "alcoholism among Cape Coloureds" (pp. 42–43 and p. 239) and "the physical and mental characters of Africans" (pp. 265–270), on the grounds that they lie beyond the scope of human geography. Their presence can be justified, however, if they help to break down some of the shibboleths about non-Europeans in Southern Africa.

By their use of fine-quality paper and bindings, by flawless printing of the text and superb reproduction of an unusually large number of excellent photographs and maps (including eight large, coloured folding maps), the publishers have helped to produce two volumes which must rank among the foremost of their kind ever to appear. The serious student should not be without them, for they will be the standard work for many years to come. School libraries will find volume II very suitable for sixth form reading. Volume I is expensive and perhaps too detailed for the classroom, but it is an indispensable reference book for the enthusiastic teacher.

Methodology aside, this great work lays out in masterly fashion most of what the geographer wishes to know about the land which lies between Cape Point and Lake Nyasa. But let us hope that Professor Wellington's work is not ended; the Congo Basin awaits re-discovery. D. L. N.

Land and People in Nigeria. K. M. Buchanan and J. C. Pugh. 19 × 25 cm. 251 pp. University of London Press. 1955. 35s.

Appearing at the time when Nigeria is about to attain self-government, *Land and People in Nigeria* summarizes much of the geographical information which has been acquired, mainly by government officers, in the course of 50 years of colonial administration. It began as a collection of maps and diagrams and has grown into a geography of Nigeria. As such it is a reliable and comprehensive work, presented in a very competent manner. Perhaps there are too many maps. Some are obviously of no more than transient interest and Figs. 156–159, for example, are out-of-date; others such as Fig. 132 are superfluous and Fig. 125 may be misleading. But the main fault of the maps is that the data have not been sufficiently interpreted; the Provincial and Divisional units used for plotting are very large in some cases, and include a wide diversity of conditions, so that the distribution patterns shown are not as meaningful as they might be had a less mechanical method of presenting them been used. Errors of fact are rare. Parts of the chapter on Public and Social Services might well have been left to a government handbook. It is pleasing to find the work of the late Dr. J. H. Mackay referred to in several places; his studies in land utilization, carried out while he was an Officer of the Forestry Department and most of them unpublished, are of considerable value. No references appear to be given to two books edited by M. Perham, *Native Economies of Nigeria* (1946) and *Mining, Commerce and Finance in Nigeria* (1947). More important is the fact that the authors have not been able to make use of information which has become available within the last three years, notably, the *Sample Census of Agriculture*, 1950–51, the *National Income of Nigeria* 1950–51 (by A. R. Prest and I. G. Stewart), and the *Population Census of* 1952–53. Instead, they have had to use figures which in some cases refer to conditions of 25 years ago. In spite of these drawbacks this is a valuable addition to the growing number of geographical works on Africa, and will be regarded by geographers as the standard book on Nigeria.

A. T. G.

Morphological Analysis of Land Forms. A Contribution to Physical Geology. W. Penck. Translated by H. Czech and K. C. Boswell. 15×22·5 cm. xiv+429 pp. London: Macmillan & Co. 1953. 42s.

With relatively few exceptions English-speaking geographers have accepted, almost without question, the concept of the cycle of erosion, so persuasively enunciated by W. M. Davis, but now that an English version of Walther Penck's classic has become available the soothing simplicity and satisfying orderliness of the old orthodoxy can be seen in all its inadequacy by those, who, like the reviewer, have hitherto been defeated by the involved language of the original. The clarity of Penck's thinking, the logic of his argument and his meticulous precision in his specially defined vocabulary were lost in the prolixity and obscurity of his writing, and this is perhaps the principal cause of the interim neglect and misunderstanding that has befallen these stimulating ideas, now more than 30 years old.

The translators have felt it unfair to provide anything but an almost verbatim translation, but they have greatly simplified the interpretation by providing summaries of each section and a glossary of English equivalents for Penck's new-minted words.

While Davis found in the cycle of erosion an explanation of the relief of the land, Penck sought, in the form of the land, evidences of diastrophism. For Davis, a geologist turned physical geographer, the land forms were the end in view; for Penck, a geologist with a geomorphologist's eye, they were a means to an end. Davis' cycle was only a hemi-cycle, a running down of energy renewed by "rejuvenation" which was accepted as a fact and assumed, tacitly, to be virtually instantaneous. Penck took great pains to show that the infinite variety of forms of the land could only be explained by a nice appreciation of the balance between the constructive forces of diastrophism and the destructive forces of erosion; winding up and running down occur simultaneously, sometimes the one predominating, sometimes the other.

Walther Penck died young, still full of ideas, and his great book was published posthumously by his distinguished father (Albrecht Penck); Katharine Boswell, too, died before she could see her translation published; she has in this book a fitting memorial.

A. A. M.

Physical Geography. A. N. Strahler. 22×28·5 cm. ix+422 pp. New York: John Wiley & Sons. London: Chapman & Hall Ltd. 1951. 48s.

In the words of the author this book is an attempt to present the simplest elements of physical geography for college students unfamiliar with the natural and physical sciences, and to provide a basis for courses of more advanced work taken by military students. The book is divided into three parts: I—The Earth as a Globe, in which is discussed the form of the earth and its motions in relation to the sun and moon, time and tidal phenomena and elementary map projections. 2—Map making and map reading, the crust of the earth, rocks and structures, landforms. 3—Weather and climate, regional climatology and soils. Review questions and exercises are provided at the end of each chapter and there is an appendix of references for further reading.

The text is supported by numerous block diagrams, line drawings and photographs, but it is doubtful if within even 400 pages we can expect an elementary and yet comprehensive treatment of all the topics with which Professor Strahler attempts to deal. The impression given is one of unevenness of content, of unnecessary compression of some topics and omission of others. The arrangement of chapters in Part 2 does not provide sufficient continuity of subject at this level and the omissions include the absence of an adequate classification of rocks and reference to such features as inselbergs and pediments, superimposed drainage, bergschrund and varves. The causes of ice ages are dismissed in a paragraph which mentions but one theory, and there is no reference to the problems of soil erosion and conservation. The exercises at the end of the chapters in Parts 2 and 3 are often accompanied by the most elementary of questions which may make for ease of marking, but cannot be guaranteed to stimulate either the sixth former or university student. In short, the book fails to provide adequate explanation of some of the topics discussed.

There is, however, much to commend it as a reference book, the wealth and clarity of illustration deserving special mention, and the presence in one volume of such a wide range of material. The book is well produced and forms a useful addition to the literature of the subject at sixth form and first year university level. N. S.

The Earth Beneath Us. H. H. Swinnerton. 14·5×22·5 cm. 320 pp. London: Frederick Muller Ltd. 1955. 21s.

This very readable book by Dr. Swinnerton, Professor Emeritus of Nottingham University, is no ordinary geology text-book; indeed, it is the drama of the earth told in a fascinating way. The fruit of a lifetime's study, geology is to the author a scientific and philosophic quest full of human interest. This is surely, also, the geographer's approach to the study of the earth.

Swinnerton considers questions which are frequently asked: How did the earth begin? How old is it? Reviewing the nebular theory of Laplace, the tidal theory of Jeans, radio-activity and explosions of supernovae, he holds an open mind for a final solution. Considering the salinity of sea-water, the braking action of tides upon the rotation of the earth; the cooling of the crust, the superposition of material and the study of fossils; the discharge of radiant energy and the formation of uranium lead, he concludes that it is not unreasonable to think that the earth has had an independent existence for 3000–4000 million years. In dating the Ice Age, the author describes the work of Penck and the gravel terraces near Innsbrück, De Geer's varves and deviations in the inclination of the earth's axis and accepts the conclusion that the Pleistocene period lasted for 600,000 years, since when there has been a post-glacial period of about 20,000 years.

The Procession of Life and the Coming of Man are the subjects of the last two parts of the book, which is well illustrated with photographs and sketches. Particularly delightful are figures 14 and 17. *The Earth Beneath Us* should be in the library of every secondary school and college. After reading it no one could think geology was dry-as-dust. E. M. C.

Equatorial Weather: with special reference to Southeast Asia. I. E. M. Watts. 14·5×22 cm. xvi+224 pp. London: University of London Press, Ltd. 1955. 21s.

As stated in the sub-title, this book has particular reference to Southeast Asia: it deals mainly with meteorology and rarely climatology, and it is a text-book. Its main achievement, then, is to review progress in the stated field. Developments in the understanding of the weather of Southeast Asia are traced from the beginnings, when workers trained in and familiar with conditions in mid-latitudes first turned their attention to the problem. Conventional methods were rejected and various others experimented with until the present air-stream analysis technique, somewhat analogous to our familiar air-mass concept, was established. It is far from being the answer to all weather forecasting difficulties, but for the present, and with the existing scarcity of reports and unrepresentative individual observations, it must serve.

The geographer will find much of interest and value. Characteristics of low-latitude weather are well brought out and much of the descriptive matter is of great climatological interest. The author's continuous comparison with mid-latitude conditions, indeed, often throws fresh light on the latter. The only regret is that Africa and America could not have been dealt with on the same scale as Southeast Asia. For specialists in the geography of that part of the world the detailed descriptions and analysis of rainfall types and air circulations over Southeast Asia will be valuable. The book is well illustrated by numerous line blocks and eight half-tones. R. M.

World Economic Geography: with an emphasis on principles. E. B. Shaw. 16×22·5 cm. vii+582 pp. London: Chapman & Hall, Ltd. New York: John Wiley & Sons, Inc. 1955. 52s.

Economic Geography. S. Dicken. 19·5×27 cm. ix+569 pp. London: G. G. Harrap & Co., Ltd. Boston: D. C. Heath & Co., Ltd. 1955. 35s.

These two recent additions to the rapidly growing list of compilations under the title of "Economic Geography" maintain the high standards of presentation reached by American publishers. Both are profusely illustrated with maps, diagrams and photographs. Dicken's book in particular is to be commended in this respect; maps and photographs have been selected with care and reproduced on a scale sufficiently large to illustrate contextual points simply and clearly.

Neither work claims to be original except in arrangement of material. From the point of view of the British student, Shaw's scheme is undoubtedly the more successful.

Dicken's eye is primarily on the American student. *Economic Geography* is an extension and revision of his *A Regional Economic Geography* (1949), but retains as its basic arrangement the pairing of the economic regions of the U.S. with comparable regions elsewhere in the world, e.g., the chapter on "The U.S. Corn Belt" is followed by introductory chapters on "Geographic Background" and concluding chapters on world trade and routes. It is a stimulating approach, but leaves the British reader feeling rather that he is "moving from the unknown to the known."

Shaw's book is especially refreshing in that it is much more concerned with the methodology of economic geography than with attempting a comprehensive factual summary of the world's economic activities. The first part of the book, devoted to "Economic Geography: meaning and approaches," starts badly and improves greatly. Opening with the question "What is economic geography?" he reaches the conclusion, after two pages, that "The complete answer involves where can, where are, why are, when are, and how are." "What is" unfortunately still remains to be answered. The remainder of Part I considers four approaches to economic geography—"regional," "activity," "topical" and "principles"—each supported by well-chosen examples. It is this introductory section which gives the book its main distinction and which makes it an excellent text for either sixth form or first year university students starting a course in economic geography. At least they will be encouraged by the spelling of "lattitude" on the Contents page. The remainder of the book gives a broad review of the world's economic activities. The agricultural considerations, based on the world's major climatic regions, are much more thorough than those of manufacturing and trade, though in each case principles rather than details are emphasized. A. C. W.

Political Geography and the World Map. Y. M. Goblet. 14×22 cm. xviii+292 pp. London: Philip. 1955. 30s.

Dr. Goblet is known to British geographers through his study of selected aspects of political geography which appeared twenty years ago under the title *The Twilight of Treaties.* Now he has presented us with ". . . the product of twenty-five years of observation and analysis in the geographical and economic fields" and in excellent English, too. His book contains eight parts. The headings of seven of them, Political Geography, Elements and Forces, Complexes, World Relations, Evolution and

Dissolution in Political Geography, Colonization and Political Geography in the Making indicate the scope of the researches of this scholarly French geographer.

We are indebted to Dr. Goblet for his clear enunciation of the basic ideas of political geography and for his brief but succinct case studies. He insists on and amply justifies his claims for the "scientific" approach to politico-geographical problems. "No subject calls for a more fully developed and alert critical faculty than political geography" (p. 26) and it ". . . offers a wide and varied field for observation, discovery, analysis and experiment" (p. 1). Here is the answer then to the unscientific "geopolitics" of recent years.

Of particular interest in this book is the chapter on The Route and its importance in the evolution of States. The author asserts that "The fundamental complex in political geography is the State" (p. 87). There can be no State without organization, in the social, economic and political spheres, and this catalyst cannot function without the movement of goods and people which routes make possible. Less satisfactory is Dr. Goblet's attempt to classify States in "Intensive," "Extensive" and "Mixed" types. He admits that "The classification of States according to their politico-geographical type can, in the present state of political geography, be no more than provisional" (p. 29). Other authors have tried to apply the criteria of power, size, stage of development, and form of government but there are too many exceptions to the rules for these classifications to be acceptable. There is no hierarchy in the strict sense among the world's States.

At the end of each chapter, Dr. Goblet gives a series of notes, expanding a point in the text, giving the original of a translated quotation, or providing references, but his book contains little by way of bibliography. This is a serious shortcoming from the point of view of the student and could be rectified in a second edition.

A. E. M.

The Golden Geography. Giant Golden Book Series, No. 5. E. J. Werner and C. de Witt. 25·5 × 33·5 cm. 93 pp. London: Publicity Products Ltd. 1954. 10s. 6d.

The sub-title of this book is "A Child's Introduction to the World," and it would seem to be suitable for children of 7–10 years, although not as a text book. In addition to a limited amount of written information, each page has very colourful drawings and maps.

The scope of the volume is somewhat ambitious. The first section, although short, provides a simple and interesting introduction to a number of fundamental facts, e.g., the position of our planet in the solar system, the causes of day and night and the seasonal changes. In the subsequent sections the teaching value deteriorates, since an attempt is made to consider all the continents, and concludes with a final section on climate. A more selective plan would have enhanced the value of this book, which is delightfully produced to catch the interest of any child. C. E. S.

The Le Play Society

President: Sir E. John Russell, O.B.E., D.Sc., F.R.S.

SUMMER VACATION MEETING IN SOUTH GERMANY

Leave London, July 31st; Return London, August 14th, 1956

The group will stay in Konstanz am Bodensee for the full time, and make excursions to Freiburg and other places of Sociological, Geographical and Botanical interest. The Leaders will be Mr. J. M. Mogey, D.Sc., M.A., of the University of Oxford, and Miss Margaret Tatton, F.R.G.S. The help of local specialists will be given.

For particulars, write to Miss Margaret Tatton, Director, at the Society's temporary address, The Birlings, Birling Gap, near Eastbourne, Sussex.

THE ANNUAL CONFERENCE FOR THE STUDY OF INTERNATIONAL AFFAIRS,

Somerville College, Oxford, December 28th, 1956, to January 2nd, 1957

Geographical Articles

Listed from Periodicals received in the Library

CONTINUED FROM VOL. XL, PP. 211 TO 214
(Held over from vol. xli, January 1956)

Journals listed here may be borrowed from the Library by members of the Association. References are listed according to the classification published in the *Annals of the Association of American Geographers*, vol. xxvii, June 1937. Authors' reprints presented to the Library are included in the list of articles. New additions to periodical accessions (since the last publication of this list) are shown below in italics.

AG—Acta Geographica. AH—*Agricultural History Review.* A of G—Annals of the Association of American Geographers. A of Sc—The Advancement of Science. BAGF—*Bulletin de l'Association de Géographes Français.* BD—*Berichte zur Deutschen Landeskunde.* BE—Bulletin de la Société de Géographie d'Egypte. BG—Boletim Geografico. BUG—Berichte über das Geobotanische Forschungsinstitut Rübel in Zürich für das Jahr 1954. CBB—*Commission Belge de Bibliographie.* CG—Czasopismo Geograficzne. EG—Economic Geography. EM—East Midland Geographer. F—Fennia. FKO—Foldrajzi Kozlemenyek. GA—Geografiska Annaler. GJ—Geographical Journal. GN—Geografiska Notiser. GR—Geographical Review. GRI—Geographical Review of India. GRU—*Geographische Rundschau.* GV—Geografski Vestnik. IGJ—Indian Geographical Journal. J of G—Journal of Geography. MJTG—Malayan Journal of Tropical Geography. MUGI—*Meddelanden från Lunds Universitets Geografiska Institution.* NGT—Norsk Geografisk Tidsskrift. PRS—Proceedings of the Royal Society. RGA—Revue de Géographie Alpine. RGI—Rivista Geografica Italiana. RGL—Revue de Géographie de Lyon. SGA—Svensk Geografisk Årsbok. SGM—Scottish Geographical Magazine. T—Terra. WV—*Wissenschaftliche Veröffentlichungen (Leipzig).*
(E)—English Summary. (F)—French Summary. (G)—German Summary. *—Map.

GENERAL GEOGRAPHY AND TRAVEL. J. N. L. BAKER, A of Sc, Sept. '55.—Geography and History. J. L. DARGENT, CBB, No. 3, '53.—Bibliographie des thèses et mémoires géographiques belges 1904–1953. G. ENEQUIST, SGA, '55.—Types of Urban Settlement (E). A. R. HALL, A of Sc, June '55.—Mackinder and the course of events. R. HARTSHORNE, A of G, Sept. '55.—Exceptionalism in Geography Re-examined. R. KLOPPER, BD, Jan. '54.—Statistics in Geography (in German).

MATHEMATICAL GEOGRAPHY AND CARTOGRAPHY. ROYAL GEOGRAPHICAL SOCIETY, GJ, June '55.—Storage and conservation of maps (Report of committee of Royal Geographical Society). T. HAGERSTRAND, SGA, '55.—Census returns, air photographs and data-processing machines. A project for combination (E). E. KOSTER, SGA, '55.—Calculation of base-angle and side proportions of block diagrams (in German).

PHYSICAL GEOGRAPHY. GEOGRAPHICAL RECORD, GJ, June '55.—Ten thousand years of accelerated erosion. E. C. BULLARD and others, PRS, Mar. '54.—Discussion on the floor of the Atlantic ocean. Part I, The sediments of the Atlantic; Part II, The deeper structures of the Atlantic. J. CORBEL, RGL, No. 3, '55.—Crevasses et rivières sous-glaciaires. A. T. GUERRA, BG, July-Aug. '54.—Cycle of erosion and peneplanation. D. L. LINTON, GJ, Dec. '55.—The problem of tors. H. SVENSSON, SGA, '55.—Some aspects on the formation of rôches moutonnées (E). P. VEYRET, RGA, No. 3, '55.—Le lit glaciaire: contradiction apparente des formes et logique réelle des processus d'erosion.

CLIMATE. R. EMSALEM, RGL, No. 4, '55.—Surfaces de discontinuité au niveau des latitudes moyennes. F. K. HARE, A of G, June '55.—Dynamic and synoptic climatology. J. RIBLET, RGL, No. 3, '55.—Problèmes d'insolation. R. D. SCHMIDT, BD, Jan. '54.—Geographical climate divisions in regional description (in German).

ECONOMIC GEOGRAPHY. R. GEIPEL, GRU, Dec. '54.—Commuting (in German). D. H. GRIST, MJTG, Mar. '55.—Rice problem. A. MELAMID, GR, July '55.—Economic geography of neutral territories.

Fifth Edition Revised

AFRICA

By L. S. SUGGATE, B.Sc. (Lond.), formerly Senior Geography Master, St. Clement Danes Grammar School.

The tempo of change—economic, social, and political—in Africa has rapidly accelerated; particularly in the years since the end of the Second World War. The opportunity has been taken by the author, therefore, of largely rewriting his standard work, which meets the needs of those studying for the Advanced level of the General Certificate and for subsequent university examinations. Many new maps, diagrams and illustrations.

432 *pages.* 90 *illustrations.* 103 *maps and diagrams*

April-May **About 15s.**

HARRAP'S
3-D JUNIOR ATLAS

Edited by PROFESSOR FRANK DEBENHAM

"An excellent production at reasonable cost. The relief given by the 3-D colouring (no glasses are needed) is remarkable and gives a very clear picture of the build of each country."—*Preparatory Schools Review.* 30 pages of maps and gazetteer. **7s. 6d.**

GEORGE G. HARRAP
& CO. LTD
182 High Holborn, London, W.C.1

New Edition

Land, Air & Ocean

R. P. BECKINSALE

Revised, reset edition of a standard work on physical geography. Many sections have been extended and rewritten, and three new chapters added—on river régimes, lakes and climate near the ground. 32 photos and 140 diagrams.

Demy 8vo. 25s. net

A Social Geography of Europe

J. M. HOUSTON

" An admirable book. He delimits his topic as ' the study of rural and urban settlements, together with population studies.' To this he adds a chapter on the development and scope of human geography . . . This coherent introduction to the vast literature of social geography."—*Higher Education Journal.* With 27 photos and 47 maps and diagrams. **21s. net**

◆

Books of Photographs

Sunlit Spain	**21s. net**
The Face of Sweden	**21s. net**
Eternal Egypt	**21s. net**
Greenland	**30s. net**
Russia in Pictures (*May* 1956)	**25s. net**
Brazil (*Sept.* 1956)	**25s. net**

GERALD DUCKWORTH
& CO. LTD.
3 Henrietta St., London W.C.2

TEACHING. ROYAL GEOGRAPHICAL SOCIETY EDUCATION COMMITTEE, GJ, June '55.—Geography in Education. C. L. BATEMAN, J of G, Dec. '55.—The magnetic map. R. N. BOWLER, J of G, Nov. '55.—Factor of place in literature. G. JOHNSSON, O. H. JOHNSSON and L. DALEN, GN, No. 4, '55.—A review of school geography (in Swedish). N. V. SCARFE, J of G, Nov. '55.—Testing geographical interest by a visual method. J. C. SHERMAN, J of G, Sept. '55.—Maps the blind can see. M. UNTERHORST, GRU, Dec. '54.—A Geography Room (in German).

BRITISH ISLES, Physical. K. M. CLAYTON, EM, June '55.—Geomorphology of the area around Nottingham and Derby. J. J. DONNER and R. G. WEST, T, No. 2, '55.—A drumlin field in Skye (E). EM, June '55.—Floods in the East Midlands. H. GODWIN, A of Sc, Dec. '55.—Botanical and geological history of the Somerset levels. A. T. GROVE, SGM, Sept. '55.—The mouth of the Spey.

Cultural. EM, June '55.—Coal production in 1954. EM, June '55.—East Midlands agriculture. M. L. ANDERSON and M. V. EDWARDS, SGM, Sept. '55.—What are the limits of possible afforestation in Scotland? A symposium. S. R. EYRE, AH, Part 2, '55.—Curving plough-strip and its historical implications. H. FAIRHURST, SGM, Sept. '55.—The roads of Scotland: I. Roman roads. G. J. FULLER, EM, June '55.—Settlement in Northamptonshire between A.D. 500 and Domesday. J. D. GOULD, AH, Part 2, '55.—Mr. Beresford and the Lost Villages: a comment. D. R. MILLS, EM, June '55.—Trent bridge: an analysis of traffic censuses. E. C. MOBBS, A of Sc, Dec. '55.—Afforestation and the community. M. ORTOLANI, RGI, Mar. '55.—Ricerche sugli insediamenti industriali del Lancashire (E). A. G. POWELL, EM, June '55.—1951 census: (2) An analysis of population changes in Leicestershire. E. M. RAWSTRON, EM, June '55.—Steel production and the East Midlands. E. M. RAWSTRON, A of Sc, June '55.—Salient geographical features of electricity production in Great Britain. J. H. SMITH, AH, Part 2, '55.—Cattle trade of Aberdeenshire in the nineteenth century. A. STRAW, EM, June '55.—Ancholme levels north of Brigg: a history of drainage and its effect on land utilization. B. THIRD, SGM, Sept. '55.—Changing landscape and social structure in Scottish lowlands as revealed by eighteenth century estate plans. J. THIRSK, AH, Part 2, '55.—Content and sources of English agrarian history after 1500.

EUROPE, Physical. O. ANGEBY, MUGI, Vol. 30, '55.—Summit levels, erosion surfaces and watersheds in Jämtland and Tröndelag (E). W. BERGER, BUG, '55.—Climate and vegetation in early Tertiary Europe (in German). M. BURGENER, BD, Jan. '54.—Structure of N.E. Central Europe (in German).* P. FENELON, BAGF, May–June '55.—L'évolution actuelle des méandres de la Dordogne au confluent de la Vezère. F. HJULSTROM, A. SUNDBORD and A. FAIK, GA, Nos. 1–2, '55.—Problems concerning the deposits of windblown silt in Sweden (maps). H. ILLIES, GRU, July '55.—Glacial morphology of Hamburg (in German). G. A. KITTLER, GRU, Nov. '55.—Soil creep in German agricultural land use (in German). J. LAG, NGT, No. 1–2, '55/'56.—Influence of wind erosion and aeolian sediments on the soils of Iceland (in Norwegian (E)). F. LINDHOLM, GA, Nos. 1–2, '55.—Sunshine and cloudiness in Sweden (maps). K. MOLDER, T, No. 2, '55.—Quaternary ice-age and interglacials in U.S.S.R. (G). H. MULLER-MINY, BD, Jan. '54.—Soil erosion in Bergland (in German).* K. SCHARLAU, BD, July '54.—Pollen analysis in Hessian Bergland (in German). A. SESTINI, RGI, June '55.—Morphology of the Dolomites (E). E. SOBOTHA, GRU, June '55.—Geology of north-central Europe (Maas to Weichsel) (in German). H. ZIEGRA, GRU, Nov. '55.—Glacial morphology of N. Germany (in German). E. ZILIMER, GRU, June '55.—German Baltic coastline since the Ice Age (in German).

Cultural. D. BACCONNET, RGA, No. 1, '56.—L'industrialisation d'une grande vallée alpestre et ses répercussions démographiques et rurales: Le Grésivaudan. G. BARBIERI, RGI, Mar. '55.—Transhumance in Italy (E). A. BOUISSY, RGL, No. 3, '55.—A propos du methane Italien. A. A. L. CAESAR, GJ, Dec. '55.—Economic organization of Eastern Europe. A. CHATELAIN, RGL, No. 4, '55.—La répartition de la richesse des populations en France. J. P. COLE, GJ, Dec. '55.—Postwar work on the waterways of European Russia. B. FERENC, FKO, '55.—Economic geography of Albania (in Hungarian). L. FRANCIOSA, RGI, Sept. '55.—Market gardening economy in the Paduli district, Naples (E). L. GACHON, RGA, No. 4, '55.—Les Alpes françaises et le Massif Central. O. GRANO, F, '55.—Character and economy of the Skerry coast of Porvoo, S. Finland (in German). K. HATTENBACH, WV, folge 13/14, '55.—Der Landkreis Bad Salzungen. F. HOFFMANN, BD, July '55.—Predominant industries in the economy of the German Bundesrepublik (in German). B. KUNKEL, GRU, Nov. '55.—Thermal and hydro-electric power in W. Germany (in German). T. LLOYD, EG, July '55.—Iron ore production at Kirkenes, Norway. R. B. McNEE, A of G, June '55.—Rural development in the Italian South. A. PIRC, GV, Vol. 26, '54.—La notion économique de l'alpe en Slovénie. E. PULS, GRU, July '55.—Harbours of Hamburg (in German).* R. RUHLING, GRU, Nov. '55.—Germany's rail traffic with her neighbours (in German). A. A.

SANTTI, F, '55.—Finnish coal and coke transport in 1948 (in German). O. SCHLIER, GRU, Aug. '55.—Economic and social structure of Berlin, 1882–1950 (in German). O. SCHLIER and E. ZASTROW, GRU, Dec. '55.—Economic and social structure in the Bundesrepublik and West Berlin, 1955 (in German). O. SCHLIER, BD, April '55.—Use of statistical findings in regional study (in German).* S. SCHNEIDER, BD, Jan. '54.—Gas industry and its influence on the landscape (in German). K. SCHROEDER, GRU, Aug. '55.—Basis and character of Berlin City (in German). M. SCHWIND, BD, July '54.—Population movements in Schleswig 1800–1950 (in German).* O. TUOMINEN, F, '55.—Geography of earnings in Finland (in German).*

ASIA. K. S. AHMAD, GRU, Oct. '55.—Pakistan—a comprehensive study (in German). L. ALSDORF, GRU, Oct. '55.—Race and language in India (in German). K. H. BUSCHMANN, GRI, Dec. '54.—Settlements and habitations of India. C. S. CHEN, MJTG, Mar. '55.—Climate and climatic regions of Taiwan. P. ESTIENNE, RGA, No. 1, '56.—Structure et relief de l'Himalaya central. M. H. GANJI, BE, Sept. '55.—Climates of Iran. M. GUHA, GRI, June '55.—Transport in Calcutta. N. HELBURN, GR, July '55.—Agriculture in semi-arid Turkey. B. W. HODDER, MJTG, Mar. '55.—Biogeographical aspects of settlement in Malaya. W. B. JOHNSTON, MJTG, Mar. '55.—Cook Islands. L. Y. KULKARNI, GRI, June '55.—Communication in Bombay State. J. E. MOJSKI, CG, No. 3, '55.—L'histoire de la mer Caspienne à l'ère Quaternaire. A. B. MUKERJI, GRI, Mar. '55.—Kashmir, a study in political geography. B. MUKHERJEE, GRI, Mar. '55.—Acculturation among the Kanikkars of Travancore. P. K. SIRCAR, IGJ, Oct. '54.—Floods and regional economy of West Bengal. N. SUBRAMANIYAM, IGJ, Oct. '54.—Tea industry in Ceylon. E. DE VAUMAS, BE, Sept. '55.—Géographie physique de l'Irak. H. J. WIENS, EG, July '55.—Riverine and coastal junks in China's commerce. G. E. WILFORD, MJTG, Mar. '55.—Phosphate deposits of British Borneo.

AFRICA. DALENSON, RGL, No. 3, '55.—Impressions d'Afrique et de Madagascar. E. F. von EICKSTEDT and L. SCHWIDETZKY, GRU, Oct. '54.—African Peoples (illustrated) (in German). M. I. HASSAN, BE, Sept. '55.—Agricultural land use in the Fayum depression. K. ITTEL, GRU, Dec. '55.—Cultural geography of the Atlas lands (in German). H. R. JARRETT, SGM, Dec. '55.—Recent port and harbour developments at Freetown. A. E. JENSEN, GRU, Oct. '54.—Changes in Abyssinia (in German). G. KNETSCH and M. YALLOUZE, BE, Sept. '55.—Origin of the Egyptian oasis-depressions. K. KRIEGER, GRU, Oct. '54.—The Zamfarawa, a branch of the Hausa (in German). J. PELLETIER, RGL, No. 3, '55.—L'habitat à Alger, les Bidonvilles. R. M. PROTHERO, SGM, Dec. '55.—Population of eastern Nigeria. R. M. PROTHERO, GJ, June '55.—Sample census of agriculture, Nigeria, 1950–1. A. REISSER, GRU, Dec. '55.—Economic geography in the Belgian Congo (in German). P. SCHEBESTA, GRU, Oct. '54.—Pygmies (in German). P. SCOTT, GJ, June '55.—Cape Town—a multi-racial city. A. SECK, RGA, No. 4, '55.—La moyenne Casamance (Senegal): géographie physique. H. SMEDS, AG, '54—'55.—Ensete planting culture of eastern Sidamo, Ethiopia. J. TRICARD, RGA, No. 1, '56.—Degradation du milieu naturel et problèmes d'aménagement au Fouta-Djalon (Guinee). D. J. WOLFEL, GRU, Oct. '54.—White North Africa (in German). E. B. WORTHINGTON, GJ, Dec. '55.—East Africa and her neighbours.

NORTH AMERICA. A. C. ANDERSON, SGA, Vol. 31, '55.—The American South—a region in transition (E). J. B. BIRD, GR, July '55.—Settlement patterns in Maritime Canada 1687–1786. H. F. CREVELING, EG, Oct. '55.—Mapping cultural groups in an American industrial city. G. A. CUMMING, SGM, Dec. '55.—The upper Mississippi waterway. L. DURAND, EG, Oct. '55.—The American Centralizer Belt. H. W. FRIESE, GRU, Nov. '54.—Intracoastal waterway of the U.S.A. (in German). H. L. GREEN, EG, Oct. '55.—Hinterland boundaries of New York City and Boston in Southern New England. P. F. GRIFFIN, J of G, Dec. '55.—Olive industry of California. J. FRASER HART, A of G, Sept. '55.—Functions and occupational structures of cities of the American South. W. D. KELLEY, J of G, Nov. '55.—Settlement of the Rio Grande Valley. J. LAING, EG, July '55.—Pattern of population trends in Massachusetts. W. R. MEAD, AG, No. 13, '54–'55.—Finnish settlement in Central Minnesota. W. H. MIERNYK, EG, Oct. '55.—Labor mobility and regional growth. E. W. MILLER, EG, Oct. '55.—Southern anthracite region—a problem area. H. J. NELSON, EG, July '55.—Service classification of American cities. W. D. PATTISON, A of G, Sept. '55.—Cemeteries of Chicago; a phase of land utilization. H. G. ROEPKE, EG, July '55.—Changing patterns of coal production in the Eastern Interior field. E. ROSTLUND, J of G, Dec. '55.—Geographic setting of San Francisco. R. G. SHAFFER, GRU, Nov. '54.—Great Lakes, traffic arteries of N. America (in German). H. R. SMITH and J. F. HART, GR, July '55.—American tariff map. V. B. SMITH, J of G, Oct. '55.—Overseas trade on the Great Lakes—St. Lawrence waterway. H. ZIEGRA, GRU, Apr. '55.—U.S.A. coal, iron and steel industry (in German).

NOW AVAILABLE

A New Westermann Wall Map of
THE BRITISH ISLES

Scale 1: 600,000 Size 72″ × 90″.

This Large-scale Physical-Political Map provides a most generous amount of detail. All major towns and communications are clearly shown. Land heights are shown by eight layer tints and sea depths with six shades so that a very vivid picture of configuration is given.

The large size ensures easy viewing from every part of the classroom.

Mounted on strong linen backing and fitted with rollers secured by fastening straps at each end. £8 10s.

WASHABLE OUTLINE WALL MAPS

These Maps are made of strong black plastic-coated fabric which can be chalked on and wiped clean with a damp cloth. They provide two reversible permanent outlines in pale blue with a few selected rivers.
Size 54 × 42 in. Each **£4 10s.**

NOW AVAILABLE: Number 4

EUROPE	1:5,000,000 one side
THE WORLD	1:24,000,000 on reverse

ALREADY PUBLISHED

1. THE BRITISH ISLES ..	1:1,000,000 one side
SCOTLAND	1: 500,000 on reverse
2. THE BRITISH ISLES ..	1:1,000,000 one side
ENGLAND AND WALES	1: 600,000 on reverse
3. SCOTLAND	1: 500,000 one side
ENGLAND AND WALES	1: 600,000 on reverse

All enquiries and orders should be sent to

The GRANT EDUCATIONAL Co. Ltd.

LONDON: 12 Cursitor St., E.C.4. GLASGOW: 91/93 Union St., C.1

CONTENTS

LIÈGE AND THE PROBLEMS OF SOUTHERN BELGIUM 83
T. H. Elkins

GULLY EROSION IN THE BRECON BEACONS AREA, SOUTH WALES 99
Trevor M. Thomas

A SCHEME OF FIELD WORK THROUGHOUT A SCHOOL. PART II 108
H. C. Wilks

VEGETATION STUDIES IN SOUTH AFRICA 114
Monica M. Cole

THIS CHANGING WORLD
Edited by L. S. Suggate

THE LOUGH ERNE DRAINAGE SCHEME. *N. Stephens and L. J. Symons* 123

POPULATION CHANGES IN WALES 1931 to 1951. *H. Carter* 126

PROGRESS OF THE EUROPEAN COAL AND STEEL COMMUNITY. *J. H. Paterson* 129

POPULATION AND ECONOMIC DEVELOPMENT IN SOUTHEAST ASIA. *B. W. Hodder* 131

THE MAGALLANES OILFIELD. *G. J. Butland* 132

THE GEOGRAPHICAL ASSOCIATION 134

REVIEWS OF BOOKS 134

RECENT GEOGRAPHICAL ARTICLES 143

The authors alone are responsible for the opinions expressed in their articles.

Authors who wish to submit articles for consideration by the Editorial Board should request a leaflet of information for contributors to *Geography* from the Honorary Editor. Manuscripts submitted for publication and books for review should be addressed to the Honorary Editor, The Geographical Association, c/o The Park Branch Library, Duke Street, Sheffield, 2.

Inquiries for Advertisement space in *Geography* should be addressed to the Assistant Secretary, The Geographical Association, c/o The Park Branch Library, Duke Street, Sheffield, 2.